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THE ANIMALS OF BRAZIL . . . By THEODORE ROOSEVELT

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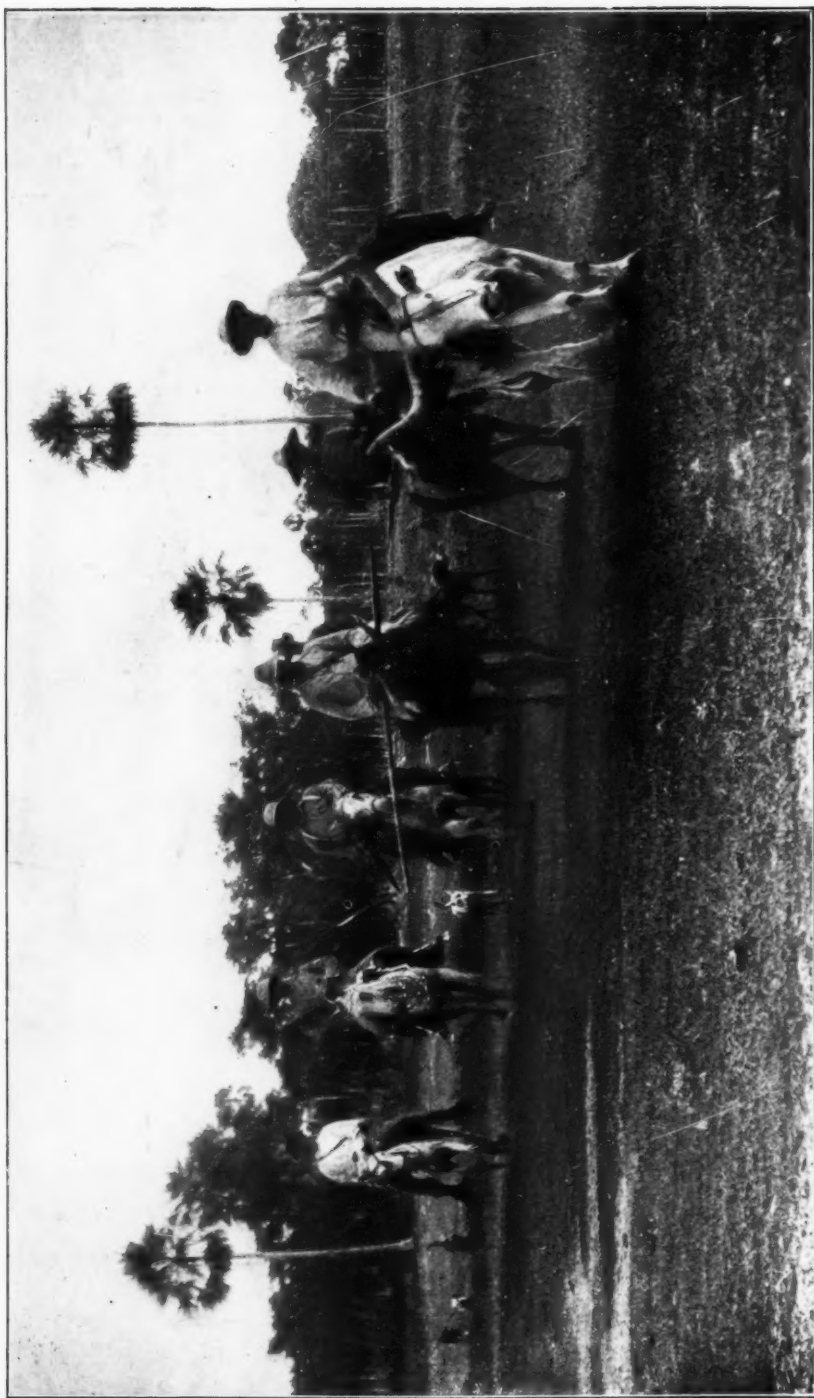


Photo by Harper  
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#### BACK TO THE RANCH FROM A JAGUAR HUNT

Colonel Roosevelt and Kermit, Colonel Rondon, two jaguar trappers with long spears, a brown boy on a long-horned steer with saddle bags holding lunch, a small pack of dogs.

"A naturalist could with the utmost advantage spend six months on such a ranch . . . He would have to do some collecting, but only a little. Exhaustive observation in the field is what is now most needed. Most of the wonderful and harmless bird life should be protected by law; and the mammals should receive reasonable protection. The books now most needed are those dealing with the life histories of wild creatures."—Quoted from p. 91, Roosevelt's *Through the Brazilian Wilderness*



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*Photo by Miller*

*Courtesy of Charles Scribner's Sons*

Roosevelt's canoe disappearing down Rio Téodoro, the River of Doubt. "Ahead of us the brown water street stretched in curves between endless walls of dense tropical forest."

## ANIMALS OF CENTRAL BRAZIL<sup>1</sup>

TOGETHER WITH MENTION OF THE GEOGRAPHICAL WORK OF THE  
ROOSEVELT-RONDON SOUTH AMERICAN EXPEDITION IN  
EXPLORING THE "RIVER OF DOUBT"

By Theodore Roosevelt

WHEN I contemplated going on this trip the first thing I did was to get in touch with Dr. Frank M. Chapman of the American Museum. I wanted to get from him information as to what we could do down there and whether it would be worth while for the Museum to send a couple of naturalists with me. On any trip of this kind — on any kind of a trip I have ever taken — the worth of the trip

depends not upon one man but upon the work done by several men in coöperation. This journey to South America would have been not worth the taking, had it not been for the two naturalists<sup>2</sup>

<sup>2</sup> As the reader pursues his fascinated way through Colonel Roosevelt's latest book, which recounts experiences on this South American expedition, he becomes impressed — if he is a naturalist, with the positive stand on certain definite points regarding natural history taken by the Author. For instance Colonel Roosevelt puts emphasis on the need for the protracted work in the field of the trained observer as contrasted with the big-game hunter or mere zoölogical collector. We concur so fully in the point made and in fact consider the matter of a complete scientific

<sup>1</sup> A lecture delivered before the members of the American Museum of Natural History, December 10, 1914.

from the American Museum who were with me, and for the Brazilian officers skilled in cartographical work who joined the expedition.

I thought of making the trip a zoölogical one only, when I started from New

headwaters of a river running north through the center of Brazil. To go down that river and put it on the map would be interesting, but he wanted to tell me that one cannot guarantee what may happen on unknown rivers — there



*Photo by Miller*

In the canoe ready for the trip down the Unknown River. At camp Rio Teodoro, Matto Grosso, Brazil

York, but when I reached Rio Janeiro the Minister of Foreign Affairs, Mr. Lauro Müller, whom I had known before, told me that he thought there was a chance of our doing a piece of geographical work of importance. In the course of the work of the telegraph commission under Colonel Rondon, a Brazilian engineer, there had been discovered the

record of such pressing importance before conditions be intruded upon in South America and races pushed to the wall by civilization, that various quotations from Colonel Roosevelt on this point have been inserted in the captions of the article and attention is hereby called to them (pages 34, 43 and 45).— THE EDITOR.

might be some surprises before we got through. Of course we jumped at the chance, and at once arranged to meet Colonel Rondon and his assistants at the head of the Paraguay, to go down from there with them.

We touched at Bahia and Rio Janeiro and then came down by railway across southern Brazil and Uruguay to Buenos Aires and went through the Argentine over to Chili. We traveled south through Chili and then crossed the Andes. That sounds a very elaborate thing to do, but as a matter of fact



*Photo by Kermit Roosevelt  
Courtesy of Charles Scribner's Sons*

WHERE THE RAPIDS WERE NARROW IN THE RIVER OF DOUBT

it was pure pleasure. It was a wonderful trip. The pass through which we crossed was like the Yosemite, with snow-capped volcanic mountains all about. Afterward we went across Patagonia by automobile and then started up the Paraguay. Our work did not begin until we were inside the Tropic of Capricorn. We took mules at Tapirapoan and went up through the high central plateau of Brazil — not a fertile country but I have no question but that great industrial communities will grow up there.

The hard work on the unknown river came during the first six weeks. In those forty-two days we made only an



*Photo by Miller*

"I shall never forget the spectacle in certain places on the Unknown River where great azure blue butterflies flew about up and down through the sunshine of the glade or over the river" or settled in gleaming masses on the bank



*Photo by Kermit Roosevelt  
Courtesy of Charles Scribner's Son*

We were little troubled by mosquitoes in the level marshy region of western Brazil. For the man who goes through the unexplored jungle however, the real dangers lie in a menace of insects — mosquitoes, gnats, ticks and fire ants — and the fevers that insects cause, instead of in cayman, anaconda or fer-de-lance, or even in the jaguar as might be supposed

average of about a mile and a half a day and toward the end we were not eating any more than was necessary and that was largely monkey and parrot. The parrots were pretty good when they were not tough but I can assure Mr. Hornaday that he could leave me alone in the monkey cage at the New York Zoölogical Gardens with perfect safety.

Both of the naturalists who were with me and I myself were interested primarily in mammalogy and ornithology. We were not entomologists and studied only those insects that forced themselves upon our attention. There were two or three types that were welcome. The butterflies were really wonderful. I shall never forget the spectacle in certain places on the Unknown River where great azure blue butterflies would fly about up and down through the glade or over the river. Some of the noises made by insects were extraordinary. One insect similar to a katydid made a noise that ended with a sound like a steamboat whistle.

We found the mosquitoes bad in only two or three places. On the Paraguay marshes there were practically no mosquitoes. In that great marsh country where I should suppose mosquitoes would swarm, there were

scarcely any. Our trouble was chiefly with gnats. These little flies were at times a serious nuisance. We had to wear gauntlets and helmets and we had to tie the bottom of our trouser legs. When we stopped on one occasion to build canoes, two or three of our comrades were so crippled with the bites of the gnats that they could hardly walk. The wasps and stinging bees were also very obnoxious and at times fairly dangerous. There were ants we called foraging ants that moved in dense columns and killed every living thing that could not get out of the way. If an animal is picketed in the line of march of these foraging ants, they are likely to kill it in short time.

There is also a peculiar ant called the

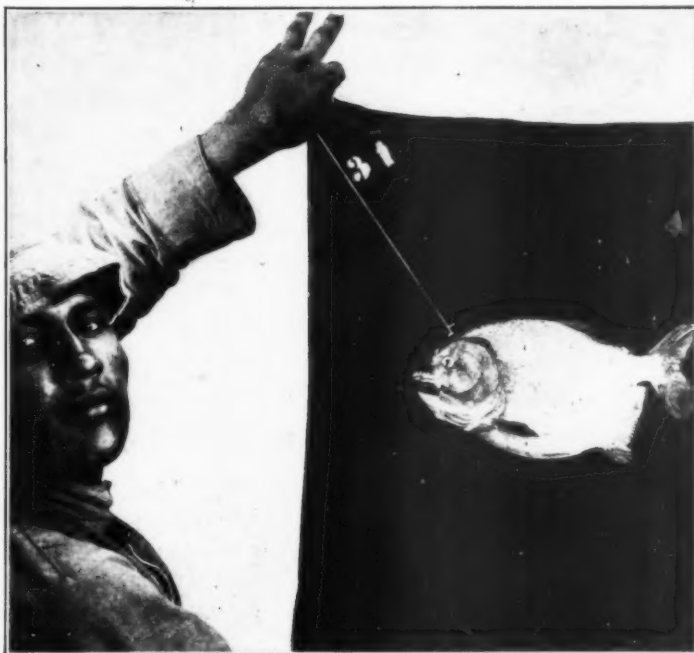


Photo by Harper  
Courtesy of Charles Scribner's Sons

Man-eating fish, piranha. "South America makes up for its lack, relatively to Africa and India, of large man-eating carnivores by the extraordinary ferocity or bloodthirstiness of certain small creatures of which the kind-folk elsewhere are harmless. It is only here that fish no bigger than trout kill swimmers, and bats the size of the ordinary 'fluttermice' of the northern hemisphere drain the life-blood of big beasts and of man himself."



leaf ant which doesn't eat a man but devours his possessions instead. I met with a tragedy one night myself. We had come down the Unknown River and had lost two or three canoes and had to portage whatever we had over the



*Photo by Miller*

The caymans, or jacarés, of the Paraguay region are not ordinarily dangerous to man, although they sometimes become man-eaters

mountain. We had to throw away everything that was not absolutely necessary. I reduced my own baggage to one change of clothing. We got into camp late and Cherrie and I had our two cots close together and did not get the fly up until after dark. My helmet had an inside lining of green and I had worn a red handkerchief around my neck. At night I put my spectacles and the handkerchief in the hat. The next morning I looked out of bed preparing to get my spectacles. I saw a red and green line. It was moving. There was a procession of these leaf-bearing ants with sections of my handkerchief and hat. I had had one spare pair of socks and one spare set of underclothing and I needed them both. By morning I had part of one sock and the leg and waistband of the underwear and that was all. It is amusing to look back at but it was not amusing at the time.

The most interesting fish that we became acquainted with was called the "cannibal fish," the "man-eating fish." It is about the size of our shad with a heavily undershot jaw and very sharp teeth. So far as I know, it is the only fish in the world that attacks singly or in shoals animals much larger than itself. Cannibal fishes swarm in most of the rivers of the region we passed through, in most places not very dangerous, in others having the custom of attacking man or animals, so that it is dangerous for anyone to go into the water. Blood maddens them. If a duck is shot, they will pull it to pieces in a very few minutes.

This side of Corumba a boy who had been in swimming was attacked in midstream by these fishes and before relief could get to him, he had not only been killed but half eaten. Two members of our party suffered from them. Colonel Rondon after carefully examining a



*Photo by Maza  
Courtesy of Charles Scribner's Sons*

A non-poisonous snake, the mussurama, swallowing the deadly fer-de-lance after having killed it. The danger from poisonous snakes in South America is very slight, "much less than the danger of being run down by an automobile at home."

certain spot in the river went into the water and one of these fishes bit off his little toe. On another occasion on the Unknown River, Mr. Cherrie went into the water thinking he could take his bath right near shore and one of the fish bit a piece out of his leg.

One of the most extraordinary things we saw was this. On one occasion one of us shot a crocodile. It rushed back into the water. The fish attacked it at once and they drove that crocodile out of the water back to the men on the bank. It was less afraid of the men than of the fish.

We were interested one day in a certain big catfish, like any other big catfish except that it had a monkey inside of it. I had never heard that a

catfish could catch monkeys but it proved to be a fact. The catfish lives at the bottom of the water. The monkeys come down on the ends of branches to drink and it seems to be no uncommon thing for the fish to come to the surface and attack the monkey as it stoops to drink. Our Brazilian friends told us that in the Amazon there is a gigantic catfish nine feet long. The natives are more afraid of it than of the crocodile because the crocodile can be seen but the catfish is never seen until too late. In the villages, poles are stacked in the water so that women can get their jars filled with water, these stockades of poles keeping out the giant crocodile and catfish. I had never seen in any book any allusions to the fact

that there is a man-eating fish of this type in the Amazon.

One day when we were going down the Unknown River Mr. Cherrie and I in the same canoe, we saw a flying fish. Of course everyone knows about the flying fish on the ocean but I had no idea there were flying fish on the South American streams. I very much wish that some ichthyologist would go down to South America and come back with not only a collection of the fishes but also full notes on their life histories.

We did not see very many snakes, I suppose only about twenty venomous ones. The most venomous are those somewhat akin to our rattlesnakes but with no rattles. One of the most common is the jararaca, known in Martinique as the fer-de-lance. One of the biggest is called the bushmaster and attains a length of about ten feet. These snakes are very poisonous and very dangerous. The mussurama is another South American snake, and it lives on poisonous snakes. It habitually kills and eats these dangerous reptiles, its most common prey being the jararaca. I saw the feat performed at a laboratory where poisonous snakes are being studied to secure antidotes to the poisons and

to develop enemies to the snakes themselves. Such an enemy is this mussurama which must be like our king snake — but larger. The king snake is a particularly pleasant snake; it is friendly toward mankind, not poisonous and can be handled freely. The scientists at the laboratory brought out a big good-natured mussurama which I held

between my arm and coat. Then they brought out a fairly large fer-de-lance about nine inches shorter than the mussurama and warning me to keep away, put it on the table. Then they told me to put my snake where it could get at the fer-de-lance. I put down my snake on the table and it glided up toward the coiled fer-de-lance. My snake was perfectly free from excitement and I did not suppose it meant to do anything, that it was not hungry. It put its "nose" against the body of the fer-de-lance and moved toward the head. The fer-de-

lance's temper was aroused and it coiled and struck. The return blow was so quick that I could not see just what happened. The mussurama had the fer-de-lance by the lower jaw, the mouth wide open. The latter struck once again. After that it made no further effort to defend itself in any way. The poisonous snake is a



*Photo by Kermit Roosevelt  
Courtesy of Charles Scribner's Sons*

Boy with parakeet and young coati. Parakeets are attractive but noisy little birds flying to and fro in the tops of palms. Coatis in jungle trees look like reddish lanky raccoons and fight savagely with both teeth and claws

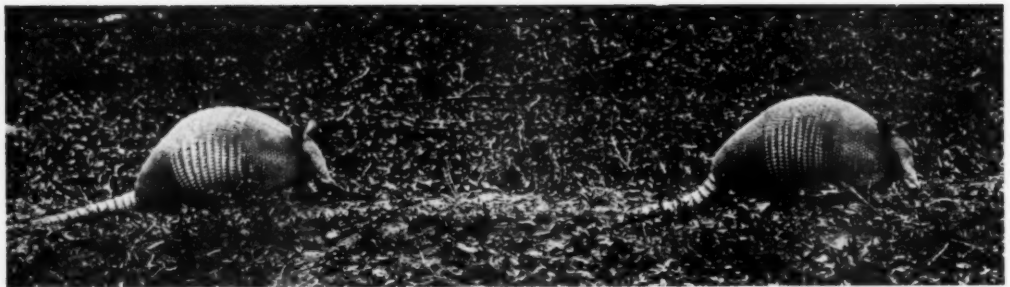


Photo by Miller

#### SOME PRIZES OF THE EXPEDITION

Colonel Roosevelt and Colonel Rondon at Porto Campo with tapirs, white leopard and peccaries.

"Nowadays there is a growing proportion of big-game hunters, of sportsmen, who are of the Schilling, Selous and Shiras type. These men do work of capital value for science. The mere big-game butcher is tending to disappear as a type. On the other hand, the big-game hunter who is a good observer, a good field naturalist, occupies at present a more important position than ever before. . . . The big game hunter of this type and the outdoors, faunal naturalist, the student of the life-histories of big mammals, have open to them in South America a wonderful field in which to work." — Quoted from p. 116, Roosevelt's *Through the Brazilian Wilderness*



*Photo by Miller*

Nine-banded armadillos in sandy pasture country. They may curl up for protection but also may bound off at a run as swift as a rabbit's — as surprising to the observer as to see a turtle gallop away

highly specialized creature and practically helpless when once its peculiarly specialized traits are effectively nullified by an opponent. The mussurama killed the snake and devoured it by the simple process of crawling outside it. Many snakes will not eat if people interfere with them, but the mussurama had no prejudices in this respect. We wanted to take a photograph of it while eating, so I took both snakes up and had them photographed against a white cloth while the feast went on uninterruptedly.

Birds and mammals interested me chiefly, however. I am only an amateur ornithologist but I saw a great deal there that would be of interest to any of us who care for birds. For instance there are two hundred and thirteen families of birds very plentiful there, either wholly unknown to us, or at least very few of them known.

The most conspicuous birds I saw were members of the family of tyrant flycatchers, like our kingbird, great crested flycatcher and wood pewee. All are birds that perch and swoop for insects. One species, the *bientevido*, is a big bird like our kingbird, but fiercer and more powerful than any northern kingbird. One day I saw him catching fish and little tadpoles and also I found that he would sometimes catch small mice. Another kind of tyrant, the red-backed

tyrant, is a black bird with reddish on the middle of the back. We saw this species first out on the bare Patagonian plains. It runs fast over the ground exactly like our pippit or longspur.

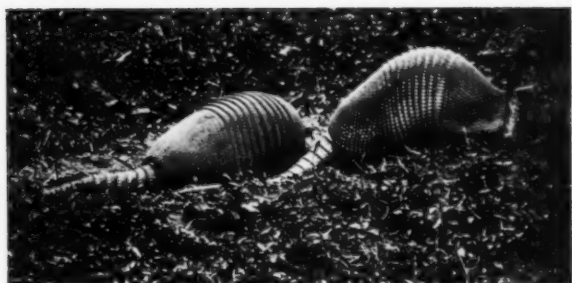
Curved-bill wood-hewers, birds the size and somewhat the coloration of veeries, but with long, slender sickle-bills were common about the gardens and houses.

Most of the birds build large nests. The oven-birds build big, domed nests of mud. Telegraph poles offer splendid opportunities for building nests. Sometimes for miles every telegraph pole would have an oven-bird's nest upon it. These birds come around the houses. They look a little bit like wood thrushes and are very interesting in that they have all kinds of individual ways. The exceedingly beautiful honey creepers are like little clusters of jet. They get so familiar that they come into the house and hop on the edge of the sugar bowl.

The people living on many of the ranches in Brazil make us rather ashamed for our own people. The ranchmen protect the birds and it is possible to see great jabiru storks nesting not fifty yards from the houses, and not shy.

Most of the birds in Brazil are not musical although some of them have very pretty whistles. The oven-bird has an attractive call. The bell-bird of the





gray hue (contrasted with the white bell-bird) has a ringing whistle which sounds from the topmost branches of the trees.

The mammals were a great contrast to what I had seen in Africa. Africa is the country for great game. There is nothing like that in South America. The animals in South America are of interest to the naturalist more than to the person who is traveling through the country and takes the ordinary layman's point of view. Only two of the animals found there are formidable. One of

these is the jaguar, the king of South American game, ranking on an equality with the noblest beasts of the chase of North America, second only to the huge and fierce creatures which stand at the head of the big game of Africa and Asia. The great spotted creatures are very beautiful. Like all cats they are easily killed with a pack of hounds, but they are very difficult to come upon otherwise. They will charge men and sometimes become man-eaters.

Another big mammal of the Brazilian forest is the white-lipped peccary. The white-lipped peccaries herd together in the dense jungles in packs of thirty or forty or sometimes as many as two or three hundred. They are formidable creatures. The young ones may be no larger than a setter dog but they have tremendous tusks. They surge and charge together and I think that they may legitimately be called dangerous.



Photo by Miller

Colonel Roosevelt in his hunting clothes ready for the day's start.

"I kept continually wishing that they [the naturalists of the expedition] had more time in which to study the absorbingly interesting life-histories of the beautiful and wonderful beasts and birds we were all the time seeing. Every first-rate museum must still employ competent collectors; but I think that a museum could now confer most lasting benefit, and could do work of most permanent good, by sending out into the immense wilderness, where wild nature is at her best, trained observers with the gift of recording what they have observed. Such men should be collectors . . . , but they should . . . primarily be able themselves to see, and to set vividly before the eyes of others, the full life-histories of the creatures that dwell in the waste spaces of the world." — Quoted from p. 161, Roosevelt's *Through the Brazilian Wilderness*



*Photo by Kermit Roosevelt  
Courtesy of Charles Scribner's Sons*

Colonel Roosevelt's first South American jaguar, brought down from a tree at seventy yards distance. The jaguar is heavier and more powerful than the African leopard, having the stout frame and muscular build of the lion. It feeds on capybara and cayman, on peccary and deer, and will even pounce on and devour large anacondas

On one occasion Cherrie was hunting peccaries and the peccaries treed him. He was up there four hours. He found those four hours a little monotonous, I judge. I never had any adventure with them myself. They make queer moaning grunts. We spent a couple of days in getting the specimens that we brought back. We had four dogs with us. The ranchmen had loaned them to us although I doubt whether they really wished to let us have them, for the big peccary is a murderous foe of dogs. One of them frankly refused to let his dogs come, explaining that the fierce wild swine were "very badly brought up" and that respectable dogs and men ought not to go near them. We might just as well not have taken any dogs, however. Two of them as soon as they smelled the peccaries went home. The

third one made for a thicket about a hundred yards away and stayed there until he was sure which would come out ahead. The fourth advanced only when there was a man ahead of him. The dangerous little peccaries made fierce moaning grunts on their way through the jungle and rattled their tusks like castanets whenever we came up.

Armadillos were unexpectedly interesting because they ran so fast. Once on a jaguar hunt we came upon two of the big nine-banded armadillos, which are called the "big armadillos." The dogs raced at them. One of the armadillos got into the thick brush. The other ran for a hundred yards with the dogs close upon it, wheeled and came back like a bullet right through the pack. Its wedged-shaped snout and armored body made the dogs totally unable to

seize or stop it. It came back right toward us and got into the thick brush and so escaped. Other species of armadillo do not run at all.

The anteaters, most extraordinary creatures of this latter-day world, are found only in South America. The anteater is about the size of a small black bear and has a long narrow toothless snout, a long bushy tail and very powerful claws on its fore feet. It walks on the sides of its fore feet with the claws curved in under the foot. These powerful claws make it a formidable enemy for the dogs. But it goes very slowly. Anteaters were continually out in the big open marshes where we got the two specimens that we sent to the Museum. They were always on muddy ground, and in the papyrus swamp we found them in several inches of water. I do not see how they continue to exist in a country with jaguars and pumas. They are too slow to run away and they are very conspicuous and

make no effort to conceal themselves.

The great value of our trip will be shown only when full studies have been made of the twenty-five hundred and more specimens of birds and mammals brought back. We will be able to give for the first time an outline of the mammalogy and ornithology of central Brazil.

Probably the most important feature of the trip was going down the Unknown River, because, of course, at this stage of geographical history it is a rare thing to be able to put on the map a new river, a river never explored, a river the length of the Rhine of which not a line is to be found on any map.

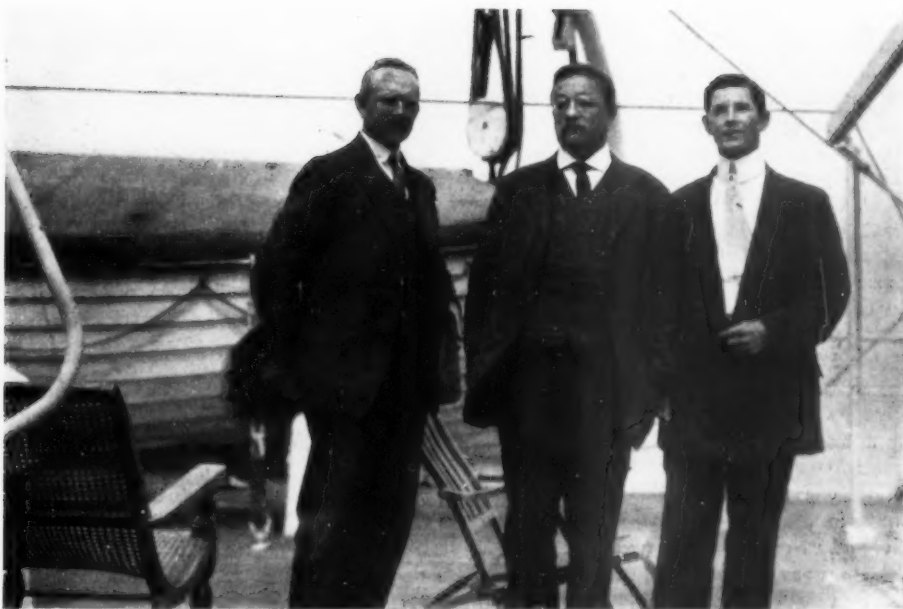
It was a journey well worth taking, a rough trip of course, but I shall always be more grateful than I can say to Professor Osborn and Dr. Chapman of the American Museum for having sent Mr. Cherrie and Mr. Miller with me, thus enabling me to take part in a zoö-geographical reconnaissance of a part of the Brazilian wilderness.





*Photo by Miller*

SOUTH AMERICAN JUNGLE ALONG THE PARAGUAY



Colonel Roosevelt and Messrs. George K. Cherrie and L. E. Miller, the two representatives from the American Museum. [The photographs used in this article are by Mr. Miller]

## THE ROOSEVELT-RONDON SCIENTIFIC EXPEDITION

A REVIEW OF ITS MOVEMENTS IN SOUTH AMERICA IN 1913-14 AND OF SOME OF ITS ZOÖLOGICAL ACHIEVEMENTS

By L. E. Miller

Mammalogist of the Expedition

THE plan of the expedition, fully decided upon after consultation with the Brazilian Government on arrival at Rio de Janeiro, took shape as follows: to ascend the Paraguay to the highest navigable point, cross the vast breadth of Matto Grosso on mule-back and descend the unexplored Rio da Dúvida. It was decided also that the main purpose of the expedition should be an exploration of the Rio da Dúvida with zoölogical collecting as we moved along or as opportunity presented itself.

The steamship "Vandyck" remained at anchorage in the harbor of Rio de Janeiro two days, which gave us ample time to view the natural scenic wonders of the harbor, and the beautiful city. The greater part of one day was spent in the botanical gardens which with the avenues of stately royal palms and large collections of plants from all parts of the tropical world, doubtless surpass anything

of a similar nature found in South America. Here Colonel Roosevelt left the party, accompanied by his son Kermit and Doctor Zahm; the remainder of the expedition consisting of Mr. George K. Cherrie, Mr. Jacob Sigg, Mr. Anthony Fiala and myself, resumed the voyage and reached Buenos Aires six days later (October 27), twenty-three days after leaving New York. We had stopped a day at Santos, Brazil's great coffee center, and another at Montevideo, the capital of Uruguay.

Although we had read and heard a great deal about the city of Buenos Aires, we were hardly prepared for the pleasant surprise that awaited us. The population of this metropolis of the south is in the neighborhood of two millions, and the city presents a clean, dignified appearance. There is no lack of modern edifices, including large hotels and splendid theatres; an electric subway was just being opened, and the zoölogical park



leaves few things to be desired. The climate also is cool and agreeable. One of the things which especially attracted our attention was the presence of great swarms of dragonflies hovering above the streets, blown into the city by the violent winds or *pamperos* which sweep across the level plains country.

Mr. Cherrie and the writer were eager to devote every available moment to the zoölogical work, so leaving Messrs. Fiala and Sigg, whose duty it was to look after the handling of the large amount of impedimenta, we secured passage on the Argentine Northeastern Railroad, which had just inaugurated through service to Asuncion, Paraguay. We took only the small amount of equipment necessary for a few weeks' work, as the two others were to come up with the remainder of our luggage via the first available freight boat. Our train was the second to make the through trip, and was scheduled to run biweekly. It was composed of seven Pullmans, two baggage cars and a dining car, and the service was good. Leaving Buenos Aires on the afternoon of Sunday, November 2, we reached Rosario at about dark. Here the train was run on to a steel boat and carried up river for about four hours, after which it continued the journey on the east bank of the Paraná. The next night we recrossed the river on a ferry boat and were landed at Encarnacion, Paraguay. Asuncion was reached late in the afternoon of Tuesday.

The railway journey had been through level plains country, interspersed at long intervals with small clumps and strips of low woods; but it is essentially a grazing country, and we passed numerous herds of cattle contentedly grazing in the vast, fence-inclosed ranges. Stalking calmly among the herds were small bands of rheas, semi-domesticated, but they were not abundant. I doubt if we saw thirty during the entire trip. Caracaras,<sup>1</sup> glossy ibises, jacanas,<sup>2</sup> rails and spur-winged plovers were numerous along the line, and frequently we saw the domed mud-nests of the oven-bird perched upon fence-posts or lower branches of trees. Villages are few and far between, and the natives, a motley crowd of dark-skinned individuals, usually left their shambling, grass-thatched huts and came down *en masse* to see the train.

Asuncion is a quaint old town, plainly

showing the marks of violence that have been left by frequent revolutions. Mr. Ferris, the American Consul, who rendered us every courtesy possible during our stay in the city, had witnessed five revolutions during his five years' residence in the capital; there had been seven presidents in the same period of time. The streets are narrow and paved with cobblestones; the buildings are of the usual adobe style, white-washed and with tile roofs. There are one or two banks, a college, several churches, a public market and a number of good hotels, as well as fair electric car and light service; there is also the inevitable lottery. There is practically no business activity. An air of depression hangs over the people like a pall, and this may readily be accounted for when one recalls the tragic history of their country. Many of the women were in deep mourning, and one authority estimated that the proportion of women to men in the country was eleven to one, but I cannot vouch for the accuracy of his statement.

After spending a few days at Asuncion, we were invited to the home of Professor Fiebrig, who lives at Trinidad, a short distance away. Professor Fiebrig is a scientist of more than local note, an instructor in the University of Paraguay and curator of the Museum. Our first zoölogical work was done on his estate. All about were tracts of low forest of considerable size, patches of brush country, grassy fields and cultivated plots. Birds were very abundant, and as practically everything was new to us, our work was doubly interesting. We here formed our first intimate acquaintance with the peculiar white ani<sup>1</sup> (*Guira*), large flocks of which were in the palm trees. The birds sat soberly on their perches, awkwardly jerked their tails from side to side and mewed dolefully. They seemed to be utterly out of place among the vivacious tanagers, creepers and finches, and to belong more properly to the fauna of some remote and unrecorded past. Mammalian life was scarce, but considering the short time available, a comparatively representative collection was made, including a series of a small rare wolf (*Canis*). We spent four days at Trinidad.

Through the courtesy of the President of the Republic, a launch was placed at our disposal, and on November 11 we started on

<sup>1</sup> Caracara: a member of the hawk family.

<sup>2</sup> Jacana: a bird that combines certain characteristics of both plover and rail.

<sup>1</sup> Member of a subfamily of the cuckoos.

a short voyage up the Rio Pilcomayo into the Grand Chaco of Paraguay. We reached a small settlement called Porto Galileo that night, where we were the guests of the "Quebracho" Company. A large mill had been erected for the extraction of tannin from logs brought in from the surrounding country, and a narrow-gauge railway was being constructed in the interior, a distance of sixty kilometers, fifteen kilometers of which was already in operation. We proceeded to the

end of the line and pitched camp on the bank of a small stream, the Rio Negro, infested with piranhas.

Our camp was merely a rough shed built of sheets of corrugated iron supported on poles driven into the ground. The river water was salt and unfit for use, so each morning several large jugs of drinking water were sent us from Porto Galileo, together with a supply of fresh provisions. All about lay marshes, swamps and large grass-



The public market place in Asuncion, Paraguay.—Asuncion, which has been the scene of five revolutions in as many years, shows plainly the marks of violence which it has suffered. An air of depression hangs over the city, business activity is at a standstill and women are seen everywhere in deep mourning



Fort Coimbra on the Paraguay River.—Built on the rocky hillside near the dividing line between Brazil and Bolivia, it has figured in many of the conflicts between these two countries

covered areas, the latter type of country predominating.

It is in the dark swamps that the precious quebracho trees grow. It was also from these same swamps that clouds of ravenous mosquitoes issued with the first signs of failing daylight, and drove us to the refuge of our net-covered hammocks. There we sweltered through the long hours of the night, listening to the angry buzzing of our outwitted assailants, which was not unlike the sound pro-

duced by a swarm of enraged bees. I could distinguish a number of different pitches and qualities in the music, blending harmoniously in one general chorus. The varying size of the insects, which ranged from individuals nearly an inch long to the small, infection-bearing *Anopheles*, doubtless accounts for the different tones produced by the vibrations of the wings. Small brockets<sup>1</sup> were plentiful in

<sup>1</sup> Brocket: a small South American deer having unbranched horns.



Through the courtesy of the Brazilian government, the steamer "Nyoac" was turned over to the expedition for its exclusive use. The men of the expedition lived on board for many weeks and traveled wherever they wished



A portion of the expedition's camp at Utiarity, a village occupied by Parecis Indians. It is half a mile away that the river dashes over a precipice two hundred and fifty feet high. This proved to be a profitable collecting place for small rodents, birds and a few larger mammals

the swamp and came out into the fields to feed morning and night, and in the tall grass, cavy<sup>1</sup> abounded. Ocelots had worn well-defined paths through the fields in their nightly raids on the cavy community. In the trees we found black howlers, night monkeys and tayras<sup>2</sup>; on the ground, opossums and various small rodents held sway. When time permitted us to take a few moments' recreation, we fished for piranhas<sup>3</sup> in the stream, the ravenous creatures throwing each other clear of the water in their frantic struggles to get at the meat bait.

After a profitable week's work on the Pilcomayo we returned to Asuncion, where we were joined by the two commissaries who had just arrived with the equipment. Two days later we boarded the comfortable little steamer "Asuncion" and sailed for Corumbá. The four and a half days' trip on the Paraguay was most interesting, although the heat was intense and insects at times were troublesome. We had entered the great *pantanal* country, and the vast marshes teemed with bird life. As the "Asuncion" plowed her way through the water, countless thousands of cormorants and anhingas<sup>4</sup> took wing; lining the pools and dotting the marshes were hordes of wood and scarlet ibises, together with herons and a sprinkling of spoonbills; egrets covered the small clump of trees as with a mantle of snowy white, and long lines of jabirus patrolled both shores. Scarcely a moment passed in which we did not see hundreds of birds. Many of the passengers were armed with rifles and revolvers, with which they kept up more or less of a fusillade on the feathered folk, but fortunately their aim was poor so that little injury was inflicted. The day before reaching Corumbá we passed an interesting old land-mark, the fort of Coimbra, built on a rocky hillside with a cluster of thatch-roofed huts nestling against the base. It is near the Bolivian border and in by-gone years figured prominently in several of the bloody controversies between the neighboring republics.

Corumbá is a very hot, dusty town built

on a high rocky elevation on the west bank of the Paraguay. The city bears the unenviable reputation of being the rendezvous for fugitives from justice from many climes, but we saw nothing of the lawlessness and disorder which was said to prevail, and the treatment we received was all that could be desired.

Having heard of a place called Urucúm, but a short distance away, which seemed to offer unusual opportunities for collecting, Mr. Cherrie and the writer immediately moved to that place and established headquarters. Urucúm proved to be a garden spot of clear, cold springs, shady groves, and plantations of tropical fruits and vegetables. Easy of access were fields, forested hillsides, marshes and lagoons in which dwelt an abundant and varied fauna. Swarms of bats of several species inhabited the mango trees as well as the culverts and manganese mines in the hillsides, and furnished an unending supply of material; squirrels, coatimondis,<sup>1</sup> monkeys and marmosets lived in the trees; on the forest floor ranged agoutis,<sup>2</sup> deer and peccaries. Traps left overnight, caught wooly opossums (*Metachirus*), small rodents and giant black lizards that fought viciously when we sought to release them. One of the mammals added to the collection at Urucúm was of unusual interest; it was the formidable *guaraguasú*, a yellow wolf which equals or exceeds in size the great gray wolf of our own north woods; it is an animal of solitary habits and is so rare that it is seldom met with. It was not previously represented in the American Museum's collection. From the hosts of birds, we secured pigmy owls, tinamous, thrushes, grebes, rails and ant birds that were out of the ordinary. We spent nearly three weeks at Urucúm, and each day we added a number of species that were new to us. In the meantime, Colonel Roosevelt and his Brazilian escort had reached Curumbá, and a hunting trip on the Rio Taquary had been planned to secure specimens of the large game that is found in that region.

December 16 found the hunting party aboard the "Nyoac" steaming up the Taquary. This boat had been placed at the disposal of the expedition by the Brazilian

<sup>1</sup> Cavy: a rodent of South America allied to the guinea pig and capybara.

<sup>2</sup> Tayra: a South American mammal resembling the weasels and martins.

<sup>3</sup> Piranha: the most ferocious small fish in the world, a deadly enemy of man, known as the cannibal fish. It is generally about twelve inches in length.

<sup>4</sup> Anhinga: the American snake-bird.

<sup>1</sup> Coatimondi: also *coatimundi* and more popularly known as *coati*. An American carnivorous quadruped, most nearly related to the racoon, called also *tejou*.

<sup>2</sup> Agouti: a rodent about the size of the rabbit.



Government, and was our "home" during the weeks that followed, until we reached Porto Campo. Besides Colonel Roosevelt, there were on board, Colonel Candido Mariano da Silva Rondon, Mr. Kermit Roosevelt, Captain Amilcar de Magalhães, Mr. Reis the photographer, a physician, a taxidermist and myself. Mr. Cherrie remained at Uru-cúm to finish the work in that locality, and the commissaries were detained in Corumbá. We reached the landing at the Estate Palmiras just at dusk and spent the night aboard, preparing the skin of a giant anteater which had been shot by Colonel Roosevelt near the river. Early next morning the party was in the saddle, galloping across the grassy marshes. Here and there small clumps of trees and thorny bushes dotted the marshes, and these were teeming with birds of many species: parrots, parrakeets and macaws flashed by with raucous shrieks, and fly-catchers calmly surveyed the cavalcade from the uppermost branches. Occasionally we flushed a small flock of teals and, in the distance we saw ibises and jabirus standing in the long grass, like white specks in a sea of green. In spots the marshes were drying, the ground covered with fish; in the small pools an almost solid mass of fishes wriggled in the shallow water which had been churned into thin mud, and at the borders, numbers constantly leapt out; the ground was strewn with the dead and dying myriads of many species.

The ranch house or *fazenda* was reached at noon; it was an interesting place, the long, low rambling buildings forming a square with an open court in the center in which trees and flowers grew, and chickens and pigs roamed at will. All about lay marshes, papyrus swamps, fields and forests. Numerous herds of half-wild cattle grazed on this vast range, and in the papyrus thickets, marsh deer were not uncommon. The main object of this excursion, was the lordly jaguar and a magnificent pair were taken by Colonel Roosevelt and his son after several all-day hunts. Another giant anteater, several deer and a capybara<sup>1</sup> were collected; also a splendid series of the rare and beautiful hyacinthine macaw was added to our rapidly growing list of treasures.

Returning to Curumbá on the evening of December 24, we were joined by the other members of the expedition and immediately

proceeded on the up-river voyage toward São Luis de Cáceres. A short side trip was made up the Rio São Lourenço, with brief stops at various points where there were evidences of game; and numbers of birds, including screamers, penelopes,<sup>1</sup> parrots and various species of water-fowl were collected, also numbers of small rodents, monkeys, deer and peccaries. The jabiru storks were nesting on the São Lourenço, their great platform nests of sticks perched in the crotches of giant trees. The young storks, two in number and fully feathered, were continually exercising their limbs by running back and forth in the nest, flapping their wings all the while, preparatory to launching forth into the big world.

Caymans were particularly plentiful in the Upper Paraguay. Scores of the evil-looking creatures lay on the sand banks, with wide-open mouths and staring glassy eyes. A fringe of trees flanked the water through which we could see the boundless wastes of *pantanal*s beyond; troops of black howling monkeys ambled leisurely away as the boat drew near, and a species of curious gray-throated parrakeet was building tremendous nests in the branches; occasionally in the same tree there were two or three nests each several feet in diameter, which the birds were entering and leaving like bees at a hive.

São Luis de Cáceres was reached January 15, and at noon the next day the "Nyoac" weighed anchor again and pointed her nose up-stream. That night we reached a small station known as Porto Campo, and as the river was too shallow to permit the steamer to ascend further, our effects were taken ashore and tents erected for a temporary camp. A few days' hunt at this point resulted in an addition to the collection of tapirs and white-lipped peccaries shot by Colonel Roosevelt, besides a goodly amount of smaller material. The preservation of the larger specimens was somewhat of a problem as the time at our disposal was wholly inadequate, and there was practically no available native help. All the skinning and preparation was done by Kermit Roosevelt and the writer, although at times valuable assistance was rendered by Mr. Sigg.

January 13 found the expedition aboard a launch (one boatload had preceded us) struggling against the swift current of the

<sup>1</sup> Capybara: the largest existing rodent, resembling the guinea pig.

<sup>1</sup> Penelope: a small South and Central American bird, a small curassow, related to the guan.



Sepotuba. A heavy houseboat-full of provisions and luggage was towed alongside and we made slow progress. There is an end to all things of earth however, and the end of our river journey came on January 16. We had reached Tapirapoan, the furthest outpost on the frontier, and immediately preparations were begun for our long dash across the *chapadão* of Matto Grosso.

Tapirapoan presented a scene of festive gaiety upon the arrival of the expedition at that point. The large, open square around which clustered the low mud-walled huts was decorated with lines of pennants, while the American and Brazilian flags fluttered from tall poles. Flag-raising and lowering was always an impressive ceremony; everybody lined up and stood at attention while the banners were solemnly raised or lowered, as the case might be, to the strains of martial music.

A large number of horses, mules and oxen had been gathered from the surrounding country; the army of natives or *camaradas* who were to have charge of them and the impedimenta, had assembled, and the warehouses were filled with cases and bags of provisions and equipment. To organize properly a cavalcade of such large proportions required some little time, but within six days after our arrival order had been restored out of chaos and the first detachment of the expedition started. This included all of the Americans, and several Brazilians to whose number Lieutenants João Lyra and Joaquin de Mello Filho had been added. Captain Amilear was to follow the next day with the remainder of the caravan. This division of the party was absolutely necessary as, on account of the great quantity of men and animals required, the expedition would have been unwieldy if it had attempted to move in one body.

The first day's ride was a short one. Early in the morning the men started to load the pack animals, many of which were apparently fresh from the ranch and had never been broken to work of any kind, so there was a good deal of confusion at first. But gradually the men became more adept at their work, the mules and oxen quieted down and little squads left the corrals, wound up the trail and disappeared in a cloud of dust. We did not follow until noon. Our mounts were good strong animals; we had both horses and mules, and comfortable saddles were also provided by the Brazilian Commission. A

four hours' canter through brush and forest-covered country brought us to the Sepotuba again, quite some distance above Tapirapoan, and we crossed the stream on a pontoon ferry made by laying a platform of boards across three dugout canoes. There were a number of new palm-leaf houses on the riverbank, so these were used for the night's camp instead of erecting the tents.

Next day we were in the saddle by nine, riding through tall virgin forest with occasional stretches of sandy soil in which only low bushes grew. It was evident as we penetrated farther into the interior that the forest zone was fast disappearing, to be replaced by the vast *chapadão*.<sup>1</sup> The heat was intense; there was no rain, and troublesome insects were lacking. At three o'clock in the afternoon we entered an old clearing. Formerly rice, plantains, mandioca<sup>2</sup> and corn had been cultivated here, but now the place was deserted and overgrown with weeds. Kilometer 52, as the spot was called, had been an important camp of the telegraph commission while work was being prosecuted in that region, but had long since been abandoned.

On January 23, a 32-kilometer ride took us to the site of an old Indian village, known as Aldeia Queimada. We were adhering closely to the telegraph line, following the wide swathe that had been cleared to protect the wires from falling trees and branches, except when a short detour was desirable to find a better crossing for some small stream. The country was of a gently undulating character, covered with wiry grass and a very sparse growth of stunted, gnarled trees. This vegetation is typical of the *chapadão*. With the exception of a few small deer and a number of birds (woodhewers and jays) there were no evidences of animal life. A clear, cold spring rippled over a pebbly bottom near our night's camp. It was the last stream we should see which discharged its water (via the Sepotuba) into the Rio de la Plata system.

Colonel Rondon had employed a number of motor trucks in constructing the telegraph line through this section of the country, several of which were still in serviceable condition. It was therefore decided that a part of the luggage should be sent ahead on the cars as far as the trail permitted, and as there

<sup>1</sup> *Chapadão*: high, nearly level upland covered with scanty scrubby forest.

<sup>2</sup> *Mandioca*: also called "manioc", the cassava-plant.

would be a wait of several days while the remainder of the expedition caught up, Mr. Cherrie and I went along to devote to collecting the time thus gained. Doctor Zahm and Mr. Sigg accompanied us. We started two days beyond Aldeia Queimada, from a point called Rio Mandioca. There were three trucks, great well-built machines of German make [Saurer], laden to their fullest capacity

with the heaviest and most cumbersome pieces of the baggage. It was a strange sight to see them racing across the uninhabited *chapadão*, at a speed of thirty miles an hour, and frequently through blinding rain and deep mud. One of the cars had a full-blooded Indian mechanic who seemed to be fully initiated into the mysteries of handling an automobile, from gathering up branches and



Parecis Indians playing head-ball.—The men show wonderful dexterity in striking with their heads the hollow rubber sphere a foot in diameter which they manufacture for the game. So far as is known this game is played by no other tribe of Indians



Native Parecis Indians returning from the field.—These semi-civilized Indians raise large crops of mandioca, corn and sweet potatoes and make clothing, hammocks and various articles for ornamental purposes



#### NHAMBIQUARA MEN WEARING LABRETS

The labrets worn are generally made of bamboo although the quills of feathers are sometimes used. All the members of the tribe wear the hair short. In spite of their good-natured appearance, they have fought with deadly weapons to prevent any inroads of civilization



#### NHAMBIQUARA WOMEN AND CHILDREN

These people probably represent the lowest type of civilization on the South American continent. Clothes are unknown to them and their only ornaments are those which have been presented by Colonel Rondon



#### UTIARITY FALLS, SOUTH AMERICA

Previous to the expedition's visit, Utiarity Falls had never been mapped or described. When it is remembered that these falls are about two hundred and fifty feet high, one can easily picture the wonderful spectacle that meets the eye of the traveler in this virgin country

stones with which to fill up the roadway when the broad wheels mired deep in the loose sand, to repairing the engines on the rare occasions when such a procedure was necessary.

We reached the Rio Sacre, beyond which point the trucks could not proceed, on the evening of the 28th. The river is here broken by a fall one hundred and fifty feet high. As elsewhere in South America, we were constantly reminded of the appalling lack of animal life. During the entire three days required to reach the Rio Sacre we saw only a few rheas, a seriema<sup>1</sup> or two, and a number of deer.

On the morning of the 29th, we crossed the Sacre on a pontoon ferry, and using a number of animals which had been held in readiness there, rode the two leagues to Utiarity, a village of the Parecis Indians; the Rio Papagaio, a clear, swift stream flows past the settlement, and half a mile away dashes over the brink of a precipice two hundred and fifty feet high.

The Parecis are a small tribe of semi-civilized Indians who live in substantial huts and cultivate large fields of mandioca, corn and sweet potatoes. Some of them wore clothes while many wore only a breech-cloth of their own weaving. They also make hammocks and various articles for ornamental purposes. The youths of the tribe engaged in a curious game of head-ball, using for the purpose a hollow rubber sphere a foot in diameter, which they themselves manufacture. They chose sides and batted the ball back and forth across a line, with their heads. The hands were not used, and they displayed remarkable dexterity and tireless energy at this form of amusement. One evening just before sundown, practically all of the men joined in

a sacred dance. For this occasion they were clothed in gaudy red head-bands from which protruded the brilliant feathers of the great blue and yellow macaw; bead neck-chains and belts, and anklets made of bunches of curious dry seeds which kept up a continuous rattling sound as the dancers stamped in rhythm with the low, wailing music of reed



<sup>1</sup> Seriema: a large, long-legged crested bird, probably related to the cranes.

Type of Indian assistants or camaradas, who were employed by the expedition to take charge of the horses, mules and oxen and the impedimenta



flutes. They stopped frequently to drink *chicha*,<sup>1</sup> and at intervals they sang the names of their dead warriors and mighty hunters, and called upon them for guidance and assistance.

Utariity proved to be a profitable collecting place. Many small rodents and a few larger mammals, including a soft-shelled armadillo collected by Colonel Roosevelt, were taken, besides a number of birds. We spent five days in the village (Colonel Roosevelt arrived three days after we did) at the end of which time Doctor Zahm accompanied by Mr. Sigg left the party and started back home. A short time later Mr. Fiala began his homeward trip down the Papagaio and Tapajos.

Utariity had been the first telegraph station in operation along the new line; the second was on the banks of the Rio Juruena, approximately one hundred kilometers away, and it required five days to reach this point. We had been compelled to reduce the amount of our baggage very materially shortly after leaving the Parecis village, as many of the cargo animals had given out on the trail, and the others were weakening perceptibly. Most of the tents were abandoned, and all superfluous clothing was left behind. The equipment for collecting and preserving specimens, unfortunately had to be reduced also, on account of its weight, so that we retained only a few hundred cartridges and about a dozen traps with which to prosecute the natural history work. This reduction of the impedimenta was unavoidable and affected every member of the party either directly or indirectly. It was one of the several instances where individual interests had to be sacrificed for the good of the whole expedition.

At Juruena we made the acquaintance of a primitive tribe of Indians who probably represent the lowest type of civilization to be found anywhere on the South American continent. They are known as the Nhambiquara. As we drew up on the river bank they gathered about and stared at the party curiously, but betrayed no hostile feelings. Colonel Rondon had but recently succeeded in establishing amicable relations with them. On his first visits to the country, numbers of his men had been slain by their poisoned

arrows, and they had resented his every step into their stronghold; but having been persistently treated with kindness, they have learned to look upon him as a friend, and some of them even appeared to be heartily glad to see him.

In stature the Nhambiquara is short, but well-built, and of a very dark brown color. Clothes are absolutely unknown to them, and practically the only ornaments in their possession are strings of beads which they had received from Colonel Rondon. Some of the men have the nose and upper lip pierced and wear pieces of slender bamboo in these perforations. Their huts or *malocas* are rude structures of grass or leaves, and they cultivate small areas of mandioca, but wild fruits, game and wild honey form the principal articles of their diet. Bows six feet tall and made of palm wood, and long bamboo arrows are used both in hunting and in warfare. Frequently hunting parties go on long tramps through the jungle, subsisting entirely on the fruits of their prowess. At night a rude lean-to is built of branches, the game is roasted in a roaring fire and eaten, and then they stretch themselves on the bare ground to sleep.

We remained a day at Juruena to rest and to develop films. The pictures taken by the various members of the party form one of the important records of the expedition, and great care has to be exercised in developing all exposed films promptly or they would be spoiled because of the hot, damp climate.

The country beyond the Juruena is somewhat rolling, but there is no appreciable change in the vegetation. We rode twenty kilometers the first day, camping on the banks of the Rio do Fomiga (February 10). Next day we travelled but twelve kilometers, reaching the Jurina, a shallow though rapid stream six hundred feet wide; the crossing was slow and laborious as there was only a very small *balsa* or ferry. Camp was pitched a league beyond, on the banks of a small stream. Near by were several deserted thatched huts, and the comparatively new graves where three Brazilians, one an army officer, had been buried. They had been slain by the Nhambiquara and buried in an upright position with the head and shoulders protruding above the ground. The following night, on the Rio Primavera we saw two other graves. The two men who had been interred here were slain while asleep in their

<sup>1</sup> *Chicha*: a fermented drink made from maize or cane sugar.

hammocks. This was the most dangerous part of the whole Nhambiquara country.

Campos Novos was reached February 16. Formerly the third telegraph station was located here, but it now stands on the Rio Nhambiquara, a league away. We were on the border of the great Cerro de Norte, a vast tract of country comprised of high, broken plateaus or mesas covered with luxuriant grass. Many small streams flowed through deep gorges, and near some of the water-courses, tall dense forest grew. The soil is fertile and would produce crops of corn and rice; cattle in great numbers could be reared on the extensive mesas, and the climate is cool and healthful. There are few portions of South America so well suited for colonization by Europeans, but on account of the remote location and the lack of means of communication, it will be several decades before this vast and fruitful region will become inhabited.

After leaving the Cerro de Norte, February 23, we again entered *chapadão* country; but the wiry grass and stunted trees were gradually being superseded by forest. Occasionally all other vegetation gave way to large areas of wild pineapples. There were many square miles of them, bearing fruit which was small but of delicious flavor.

We added few specimens to the collections after leaving Utiarity. Animal life was not abundant, and the rapid pace at which the expedition was compelled to move left no time for collecting. At José Bonofacio, which was reached February 23, an interesting rodent, somewhat resembling a gopher, was taken. In order to secure the single example it required a half day's time and the assistance of five Nhambiquara. A reward of bunches of coral beads had been offered

the Indians if the animal was secured, so they immediately began work with sharpened sticks and with their hands. By noon they had excavated ten cubic yards of earth and won the prize. The expedition had gone on ahead but was overtaken in the evening.

At a camp named Siete de Setembro the two divisions of the expedition were reunited. Captain Amilcar and his party had arrived a



Parecis babies at Utiarity

day or two before, and a halt was made to divide the equipment and provisions between what were to be the Dúvida and Gy Paraná parties. The Rio da Dúvida was only ten kilometers away, and on February 27 we stood on the bridge that spans the river and watched Colonel Roosevelt and his party in seven canoes disappear down the stream. Colonel Roosevelt was accompanied by his son Kermit, Colonel Rondon, Lieutenant Lyra, Mr.

Cherrie and Doctor Cajazeira, and fifteen native assistants.

The Gy Paraná party was composed of Captain Amilear, Lieutenant Mello, a geologist, a taxidermist and myself, besides a number of natives. We traveled three days longer to reach the Commemoracao. The spot was called Barao de Melgaço, and marked practically the end of the telegraph

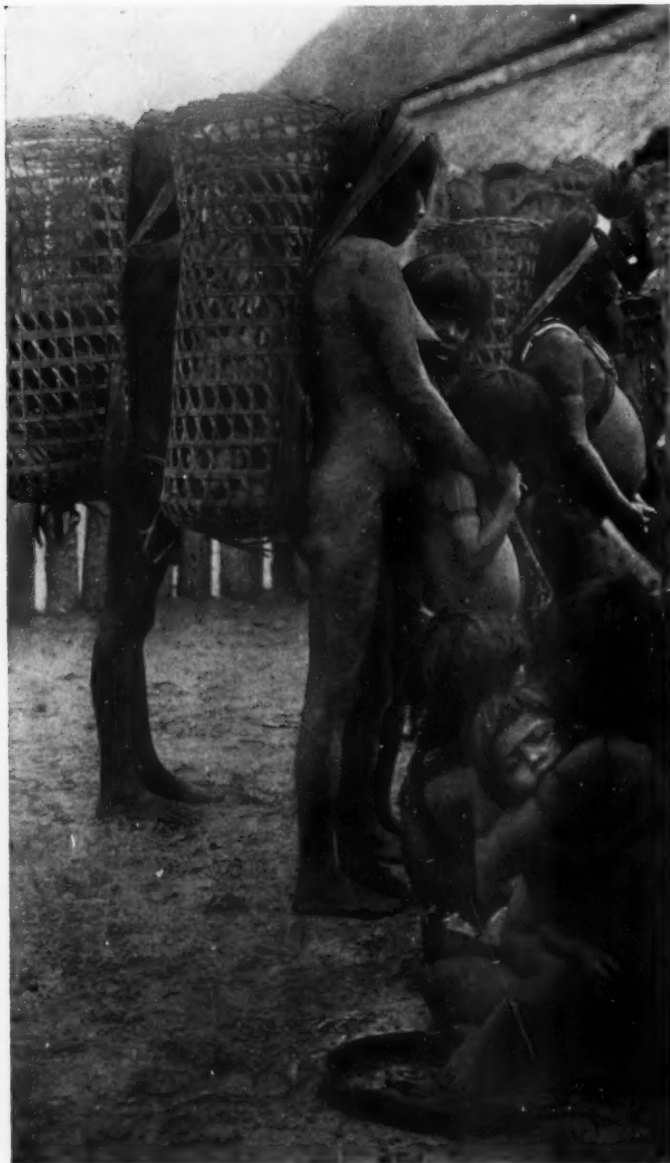
line. The trip from Tapirapoan to the Commemoracao had required exactly forty days; the distance is approximately five hundred and forty-eight miles. Many of the pack animals were in such poor condition that they had to be shot. It is impossible to say how many had been lost on the way, but the number was very large.

Barao de Melgaço seemed to be the headquarters of annoying insects and disease. Most of the handful of men at work on the telegraph line were ill with fever and beriberi, and there had been twelve deaths just before our arrival.

We had expected to find canoes awaiting us, but as there were none, the men cut down a tree of ample size and began making one. This work, we estimated, would require a month; but after a wait of two weeks a large canoe arrived from down river.

The time at Barao de Melgaço was profitably if not pleasantly spent. All about the little clearing rose the stately Amazonian forest, providing admirable collecting grounds. Many birds and mammals were taken, all new to the collection. The latter included an undescribed spider monkey and a saki<sup>1</sup> of a new genus.

We started down the Commemoracao



*Photo by Cherrie*

Nambiquara women and children with baskets of vegetables from the field

<sup>1</sup> Saki: a South American monkey with a bushy tail and a ruff of long hair around the face.

March 13, and traveling rapidly with the current reached the Pimiento Bueno, eighty kilometers below, that night. The junction of the two rivers forms the Gy Paraná.

The Gy Paraná at its very beginning is a mighty river, a thousand yards wide, and day by day as we raced with its swirling torrent we watched its rapid growth until near the mouth it reached a breadth of at least two miles. The country on both banks is heavily forested, and along the upper course is inhabited by a tribe of Indians which had been absolutely unknown. We were the first white men to see them, and they had never seen white men before. In appearance they differed greatly from their neighbors, the Nambiquara. We met seven, all men, and finally induced them to accept gifts of beads and knives, in return for which they gave us wonderfully decorated arrows six feet tall.

The Gy Paraná abounds in formidable rapids, like many South American rivers, and we had numerous overland portages, the longest being about three miles, around the falls of

São Vicente. Insects are abundant, and the whole region is a vast breeding ground for malaria. A number of rubber camps are situated on the lower river, the forests being rich in hevea. We reached Manaus April 10, having stopped at Calama, a station on the Madeira, for a short period of collecting.

As the Dúvida party had not arrived, I almost immediately left for the Rio Solimões where several weeks were spent to advantage adding to the collections. Among the large number of specimens collected were agoutis, woolly monkeys, squirrel monkeys, sloths, many small rodents and squirrels, all new to us; and the complete material for a group of hoatzins or lizard-birds was also collected. The collections now numbered about fifteen hundred birds and about four hundred and fifteen mammals, practically all of species unknown to us, and some of which are no doubt new to science.

Colonel Roosevelt's party reached Manaus the last day of April, but the story of their experiences on the unexplored river is too well known to warrant review.



Loading canoes for the start down the Rio da Dúvida

## ROOSEVELT'S "THROUGH THE BRAZILIAN WILDERNESS"<sup>1</sup>

By J. A. Allen

IN a volume of four hundred pages, with numerous half-tone illustrations, Colonel Roosevelt has given a charming narrative of his eventful expedition through a little known part of the Brazilian hinterland. The main journey of exploration was up the Paraguay River to its source, across the low divide to the head of the Gy-Paraná, and down the unexplored "River of Doubt" (Rio da Dúvida), now the charted Rio Téodoro,<sup>2</sup> as since named by the Brazilian Government, in honor of the eminent American field naturalist, its first explorer.

The trip had been for a considerable time in contemplation, but the initiative steps were only taken early in June, 1913, following a luncheon at the American Museum at which both Father Zahm, one of Roosevelt's companions on the expedition, and Colonel Roosevelt were guests. As told by the author in his first chapter, entitled "The Start," Curator Chapman of the Museum suggested the coöperation of the Museum, and brought the matter to the attention of President Osborn, who cordially approved the plan. As a result, Colonel Roosevelt offered to take two natura-

lists, to be selected by the Museum, as members of the expedition. Fortunately the Museum was able to secure George K. Cherrie, widely known as a field naturalist and explorer in the American tropics, as one of its representatives, and for the other Leo E. Miller, who was already in the employ of the Museum in South America, and had shown unusual efficiency as a collector and field naturalist through several years of difficult service. The two men proved to be most congenial companions for the head of the expedition, resulting in harmonious and enthusiastic team work.

For some months in advance of the journey down the Dúvida, Cherrie and Miller were making good use of their time, collecting birds and mammals for the Museum on the upper Paraguay River, while Colonel Roosevelt was engaged with his lecture tour to the principal cities of southern South America. Later Cherrie accompanied him down the Rio Madeira, Miller again joining the main party at Manaos. The success of the natural history work is already a matter of record in the AMERICAN MUSEUM JOURNAL.

The narrative, *Through the Brazilian Wilderness*, is a book of unusual interest for the lay reader and one of rare charm for the naturalist and explorer. The pages teem with information about the country, its natural history, its economic resources and its human inhabitants, whether wild unclad Indians or European colonists, written with the inspiration that only the fresh impressions of daily events and experiences, jotted

<sup>1</sup> THROUGH THE BRAZILIAN WILDERNESS. By Theodore Roosevelt. With illustrations from photographs by Kermitt Roosevelt and other members of the Expedition. New York: Charles Scribner's Sons. 1914. 8vo., pp. xiv + 383, 49 full-page half-tone plates and 2 maps.

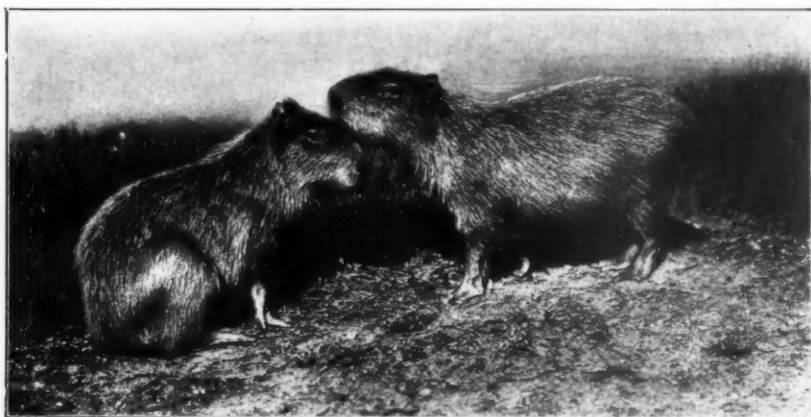
<sup>2</sup> Besides this general review and consideration from the zoological standpoint by Dr. Allen, the JOURNAL will print in the March issue a review by Dr. W. L. G. Joerg of the American Geographical Society. Dr. Joerg will review *Through the Brazilian Wilderness* from the standpoint of the geographical work accomplished by the Roosevelt expedition. — THE EDITOR.



down in the field, can impart. Add to this the personality of the writer, his wide interests, exceptionally varied experiences and the knowledge of an expert in many lines of natural history research, and the elements are happily all present for the production of a book of just the kind the author has given us. The excellent illustrations with which it abounds add greatly to its value, graphically reproducing scenes and animals mentioned in the text.

The journey down the River of Doubt

tory collector, and no museum in America possessed specimens of the birds and mammals of the country visited. The five hundred mammals and two thousand five hundred birds obtained, thus add enviable riches to the resources of the Museum. They prove not only to contain a considerable number of species new to science, particularly among the mammals, but also all are new to the American Museum as well as to the available material for research in America. The species that are not new are of quite



Capybaras of Brazil are pig-like rodents, as large as small sheep, which swim and dive with great facility, often hiding under the water lilies of the pond with only the nostrils at the surface. Perhaps their greatest enemy is the jaguar. If the expedition shot a capybara and it fell into the water, it was devoured in a very few moments by piranhas, the cannibal fishes

proved one of great danger and much hardship, and only the fitness of the party for difficult undertakings saved the expedition from complete disaster. All this is simply told, such experiences being accepted as part of the day's work in the exploration of unknown wilds.

The physiographic and natural history observations so well set forth in the narrative are immensely supplemented by the large collections secured and safely transported to New York. Only small portions of the country traversed had ever been visited by a natural his-

as much importance as those that are so, since they throw new light upon the faunal characteristics of an almost unknown country, and upon the geographic ranges of species previously known only from elsewhere. The field notes of the collectors, Cherrie and Miller, are perhaps almost as valuable an asset to science as are the specimens to which they relate. We may therefore well congratulate Colonel Roosevelt on the outcome of his expedition from all points of view, and the American Museum for its modest share in the undertaking.



## GUARDING THE HEALTH OF ARMIES

### FOOD ALLOWED THE SOLDIER IN THE WORLD'S VARIOUS ARMIES — PROTECTION OF THE SOLDIER FROM DISEASE

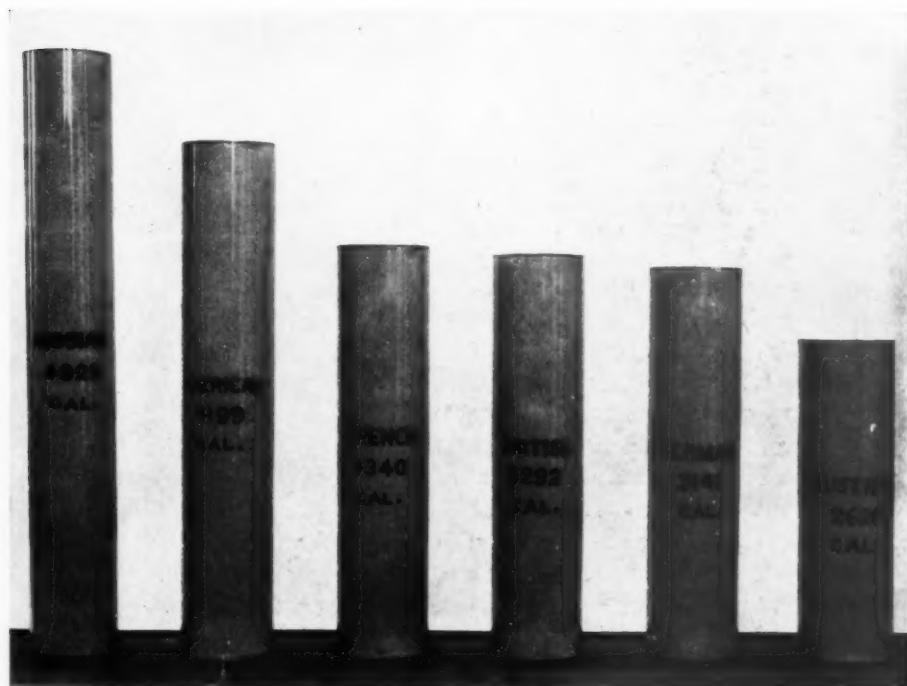
By C.-E. A. Winslow

**I**N the midst of the shock of the European war it is at least satisfactory to realize that the sufferings of the battle-field are not aggravated by the concomitant horrors of pestilence, to the extent which has been the case in earlier wars.

In many ways the present European conflict presents sanitary problems of unusual difficulty. In permanent fortresses health conditions may (except under conditions of prolonged siege) be guarded against pestilence with comparative ease. On the other hand, field armies operating in the open and

fighting only occasionally as in earlier campaigns enjoy many sanitary advantages. Almost incessant daily warfare between troops established in hastily constructed trenches where such fundamentals of sanitation as good drainage are almost out of the question, makes the protection of the health of the soldiers a task of stupendous difficulty.

The seed which might bear fruit in devastating epidemics was not lacking last year. Just before war was declared cholera had been prevalent in certain provinces of southwestern Russia just in the path of the armies which invaded



Comparative dietary allowance in various armies. Energy allowance in calories allowed in the soldier's dietary of various nations. From the military hygiene exhibit in the hall of public health of the Museum

Austrian Galicia, and this disease did spread to a considerable extent last fall among both armies and in the civil population of the war zone.

No epidemic of large proportions resulted however, and although we do not know what the next year may bring forth, we have good ground to believe that the old-time wholesale pestilence will be effectively prevented by the

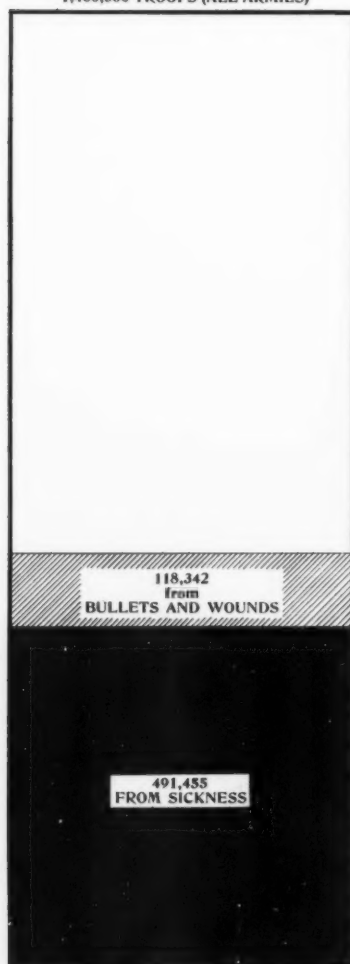
application of the art of modern sanitation. In view of the wide public interest in all that concerns the World war a special exhibit has been installed in the hall of public health of the American Museum of Natural History to show by what methods the modern army in the field is protected against the ravages of disease.

In the Crimean war of 1853, 23 per

#### BEFORE THE DAYS OF SANITATION

##### CRIMEAN WAR 1853-1856

1,460,500 TROOPS (ALL ARMIES)



#### IN MODERN TIMES

##### RUSSO-JAPANESE WAR 1904-1905

1,200,000 TROOPS (JAPANESE ARMY)



#### RELATIVE DEADLINESS OF BULLETS AND DISEASE

A striking diagram from the military hygiene exhibit in the Museum's hall of public health

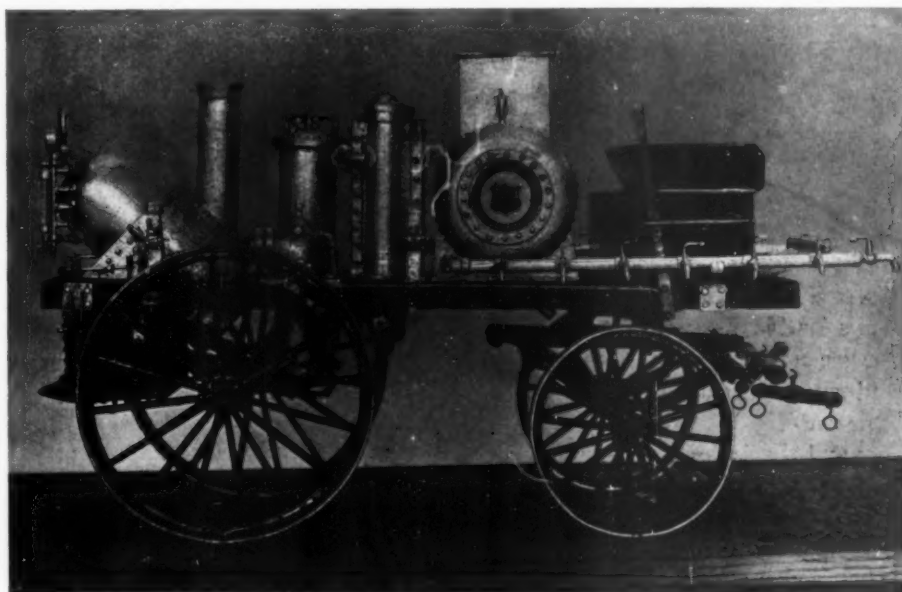
cent of the British soldiers died of disease, and in the Franco-Prussian war of 1870-71, 14 per cent of the French soldiers perished in the same way. The German forces in the Franco-Prussian war, the English army in the Boer war and the Japanese who fought Russia in 1906 lost in each case about 2½ per cent of their men from disease, a splendid record compared to that of earlier wars, but still one that represents a fearful waste of human life. In the Boer war the English lost over 14,000 men from disease and less than 8,000 from wounds. In our own Spanish-American campaign, typhoid fever alone cost more than fourteen lives for every thousand soldiers, and bullets only two for every thousand.

The chief diseases of the camp are those which, like typhoid fever, are caused by sewage pollution of water and food supplies. In the Spanish war the typhoid fever, which affected one out of every five of our volunteer soldiers, was

mainly due to careless exposure of excreta and the spread of the germs to food by flies. In a modern military camp the excreta are received in a trench away from the water supply, the kitchen and food stores, and are immediately covered with earth to prevent access of flies.

The water supply of the army is safeguarded with the greatest care. When the troops are in the field all water for their use is purified either by heat, filtration or chemical disinfectants, and the most stringent regulations forbid drinking from roadside wells and streams. The Japanese use a field filter in which the water is strained and at the same time disinfected by chemicals. In the French army the water supply of the troops is sterilized by the use of ultra-violet light.

The most common procedure for purifying water in the field is perhaps sterilization by heat, or distillation. The Forbes sterilizer (on this principle)



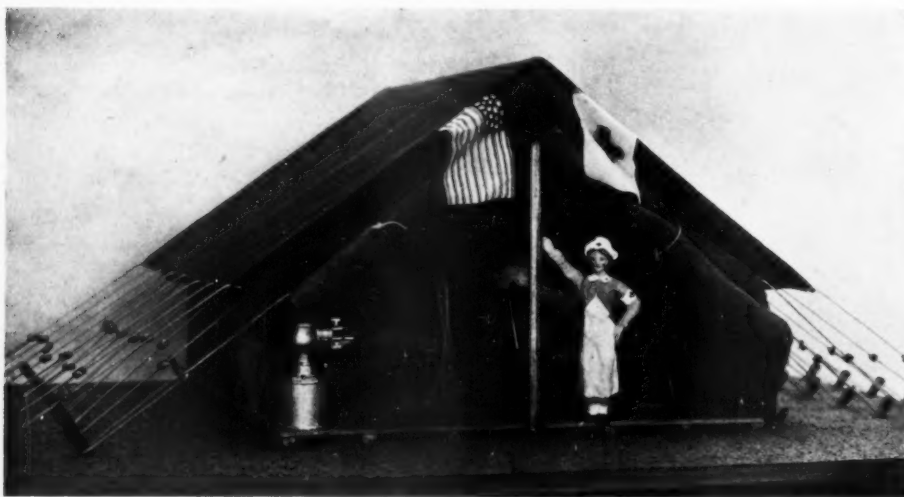
Model of the Forbes water sterilizer used in the United States Army for the purification of the water supply of troops in the field. From the military hygiene exhibit in the hall of public health



was officially adopted by the U. S. Army after competitive tests conducted by a special board in 1898. In this ingenious apparatus the water is distilled in a closed chamber so that it is not deprived of its natural gases and the outgoing water warms the incoming water and is cooled by it (on the regenerative principle) so that economy of fuel is ensured. Such an apparatus, including boiler, pumps, filter, sterilizer and storage tanks, is mounted on an army wagon and carried everywhere along with the troops.

potatoes, 20 oz.; prunes or preserves, 1.28 oz.; coffee, 1.12 oz.; sugar, 3.2 oz.; evaporated milk, 5 oz.; vinegar, .16 gills; salt, .64 oz.; pepper (black), .04 oz.; lard .64 oz.; butter, .5 oz. Of this ration, just a portion is carried individually by the soldier, the rest, such as butter, lard, pepper and syrup are given in bulk to the companies and then distributed to the men at meal time.

When communicable diseases do break out, the medical officer is provided by the advances in bacteriology with



Red Cross Field Hospital.—Model on exhibition in the military hygiene exhibit of the hall of public health, American Museum of Natural History

The strength and efficiency of the soldier is conserved and his resistance against disease is built up by a carefully selected and scientific dietary designed to furnish the necessary energy in the most compact and convenient form. The energy allowance varies in different armies — the Russian and the American receiving a larger and the Austrian a smaller allowance than the French, English or German soldier.

The average daily field ration of the United States Army is made up as follows: bacon, 12 oz., or fresh meat, 20 oz.; bread, 18 oz.; beans, 2.4 oz.;

prompt and effective means of diagnosis by which the infected individuals may be promptly picked out and isolated so as not to endanger their fellows. Against smallpox and typhoid fever the modern soldier may enjoy practically complete protection, thanks to smallpox and typhoid fever vaccination. The perfection of the vaccine for typhoid fever is the most recent and perhaps the most important of all advances in military hygiene, and the terrible typhoid death rate of the Boer war and the Spanish war will never again occur where this preventive has been used.

The death rate from typhoid fever in the United States Army per 1000 mean strength was 3.20 in 1908 with no vaccination, 3.58 in 1909, 2.43 in 1910, .85 in 1911 with voluntary vaccination, and those rates dropped to .31 in 1912 and .03 in 1913 when compulsory vaccination was introduced. The reservists in certain European armies were not protected against typhoid fever at the opening of the European war, but the difference in the incidence of disease among them and the vaccinated regulars soon taught the lesson that this precaution could not be neglected.

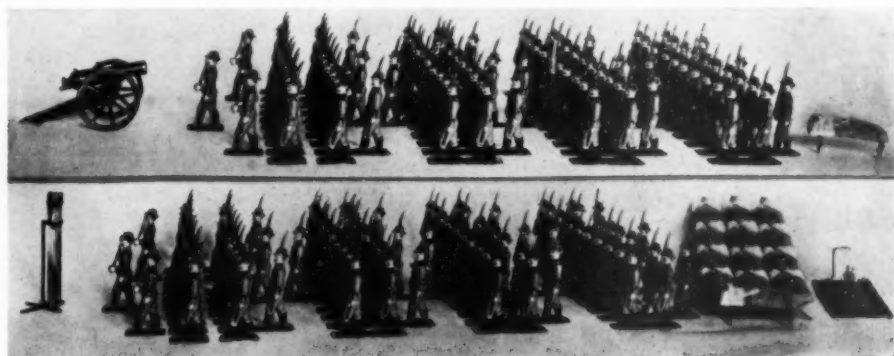
In connection with the after effects of the wounds received in battle the resources of modern bacteriology have also been drawn upon extensively. Each soldier is of course provided with a first aid kit for the treatment of minor wounds; and the splendid organization of the International Red Cross is of course on hand to provide prompt and efficient hospital care; but there has been in the present European war a terrible loss of life from tetanus, or lockjaw. The tetanus bacillus is abundant in the soil of manured land, and wounds have become infected with this germ on a far larger scale than was the case in such wars as that in South Africa fought over virgin soil. Antitoxin, if

administered early, will generally prevent fatal results from this disease and laboratories in the United States are working night and day to provide this specific for the European combatants.

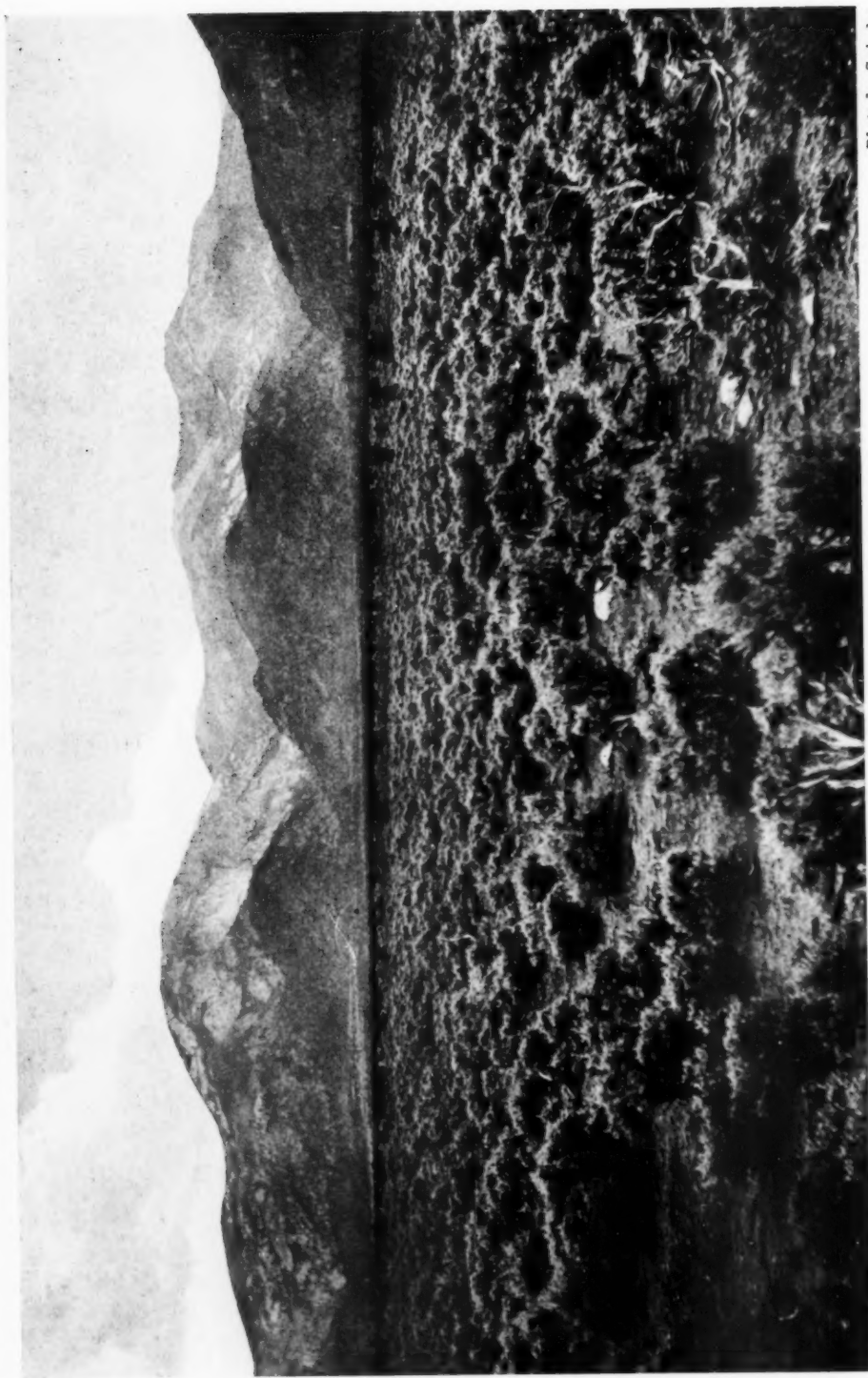
Modern sanitation has produced even more striking effects in military than in civil life, because its teachings have there been more consistently applied. The result has been that many diseases once very terrible have become of minor importance in armies; and as the table shows, measles and mumps are to-day more common causes of invalidism for the United States soldier than either typhoid fever, tuberculosis or diphtheria.

RELATIVE IMPORTANCE OF CAUSES OF SICKNESS IN THE UNITED STATES ARMY [IN RATES PER 1000 MEAN STRENGTH]

	1904-1906	1907-1909	1910-1912
Venereal	193.	196.	166.
Malaria	85.3	49.3	31.4
Diarrhea	80.0	45.4	33.0
Bronchitis	50.7	38.5	32.4
Influenza	29.6	32.5	17.0
Alcoholism	27.5	29.3	22.9
Mumps	19.3	9.5	11.7
Dysentery	17.9	9.8	4.5
Rheumatism	17.5	14.3	10.0
Dengue	14.8	19.9	17.3
Measles	8.7	11.4	9.9
Typhoid	4.8	3.9	1.1
Tuberculosis	4.7	4.5	3.7
Diphtheria	.4	.6	.8



Models from the Museum's hall of public health showing the relative effects of bullets [above] and typhoid [below]: one wounded and none dead of a company of soldiers in 1908; thirteen sick and one dead, victims of typhoid, from a company in 1898



*Photo by Spinden*

SANGRE DE CRISTO MOUNTAINS FROM THE SAGE PLAINS NEAR TAOS



## HOME SONGS OF THE TEWA INDIANS

By Herbert J. Spinden

THE songs of the Tewa Indians may be divided into two broad groups, the first religious, the second familiar. The songs that are primarily religious are the ones used in the great ceremonies and dances and those that refer to warfare and the chase. All songs which are supposed to be endowed with magical power are called "Pina<sup>ng</sup>" or "Magic Songs." Such songs in the ceremonies are supposed to induce the gods to bring rain and fruits or whatever else is required. War songs bring confusion to the enemy. Hunting songs, sung either by the hunter himself or by a female relative who remains at home, are supposed by merely mentioning the lion and the bear to transfer the hunting abilities of these animals to the hunter, while naming the deer is sufficient to deliver game into the hands of the hunter. The songs that occur in the myths nearly always have a deep religious significance. There are also witch songs which have power to do evil unless they are warded off.

Familiar songs include lullabys, avo-

cation songs, love songs and homesick songs — songs which are intimately connected with life and which reflect the everyday philosophy of the people. I will not discuss the question of their music, largely because this phase of Pueblo life has already been treated by persons much more competent to handle it than I. What I wish particularly to call attention to is the word content, the sentiment and the poetic construction of the songs.

Here are two songs in the original text and in translation. The first is a little song which might be called the "Home Sweet Home" of the Tewa:

Navi âwi nâwâ, âwi nâwâ  
 Navi âwi nâwâ ndi o<sup>n</sup> sha  
 O'i<sup>n</sup> pi<sup>n</sup> ndo mu'iri kâ<sup>ny</sup>i na nandi  
 Nâ re sitâ â hi yo he'e wâ  
 Â hi yo he'e wâ, Â hi yo he'e wâ  
 Navi âwi nâwâ ndi o<sup>n</sup> sha.

My home over there, my home over there,  
 My home over there, now I remember it!  
 And when I see that mountain far away  
 Why, then I weep. Alas! what can I do?  
 What can I do? Alas! what can I do?  
 My home over there, now I remember it.

Whether it is the result of accident or intent, this appealing lyric has an almost perfect poetical construction. The repeated phrases which are used so skillfully here, are found in almost all examples of Pueblo songs. The sentiment is simple, direct and fundamentally human; yet as we all know, such simple emotions are often hardest to express.

In translating this song and the others that follow, I have taken no liberties with the text. Tewa sentence construction is not unlike English in the general order of words and in no case have I found it necessary to shift the order of a phrase. The ordinary prose seems to have many more connectives than does the poetry, which is characterized by condensation and by more or less conventionalized phrasing. Aside from following the text accurately in the matter of the meanings of words, I have endeavored to give something of the atmosphere of the language which is peculiarly rich in exclamations. Words with such emotional connotation as "How I wish it were otherwise!" or "What can I do, alas!" occur frequently.

The second song is supposed to have been originally sung by a boy from Tesuque Pueblo, at the trysting place to which the girl no longer came.

Su k'wa k'e we na povi tsha nde  
 I<sup>n</sup> povi i<sup>n</sup> povi ndo mu iri  
 Ka<sup>nyi</sup> na na ndi nâ re sitâ  
 I<sup>n</sup> povi i<sup>n</sup> povi ndo mu iri  
 Ts'e oki t'agi na povi tsha

At Su k'wa k'e there used to bloom a flower —  
 That flower, that flower, whene'er I see it now  
 Alas, so far away, why then I weep;  
 That flower, that flower, whene'er I see it now,  
 For yellow, fresh and full-blown once it  
 bloomed.

This little song is interesting as a sustained metaphor. It may be noted in passing that Tewa children are usually given a name in accordance with the time of the year they are born. Flower

names are very frequently given to girls so the age-worn comparison of the girl and the flower fits in nicely with local usage.

Certain phrases that recur in these two examples indicate that poetical forms are pretty well set. Like all home-loving people there is no phrase quite so sad as *ka nyi na na ndi* — "far, far away." Even the men are not too brave to have recourse to tears when they think of the village in the green valley that holds their loved ones.

Among the most charming of all songs are lullabys. The Tewa mother singing her little baby to sleep sometimes takes advantage of what we call sympathetic magic, to achieve her purpose. The song is addressed not to the child but a bird called "Puye." This bird is very sleepy by nature and of course has power to teach the child to follow its example. My earlier informants seemed to think that the little puye birds are bats but an old woman of Santa Clara declares they are not bats but instead small drowsy birds that live in the high mountains. In former times these birds were tamed as household pets and their sleep-producing faculties were appealed to by the mothers of crying children.

There are many sleepy little birds,  
 Sleepy little birds, sleepy little birds,  
 So go to sleep, my little girl,  
 My little Frosted-Cockle-Burr,  
 O, come you sleepy little birds  
 And slumber on her hollow eyes  
 That she may sleep the livelong day,  
 That she may sleep the livelong night.

You may have noticed that the name of the child is interpolated in the song. The little girl of my informant was born in the winter time and was named Frosted-Cockle-Burr.

When children grow up so they can talk and run about they soon learn to fear the *Säveyo Sendo* or "Giant Canni-



bal Old Men." These bogies are impersonated at Christmas time by men who wear masks and carry whips. When they enter the pueblo the children run and hide in the inner rooms but the masked men go from house to house asking how the children have behaved during the year. In case one has been incorrigible he is severely whipped. As a rule the punishment is not severe and a promise to mend one's ways is sometimes sufficient to ward off the dreaded whips of wide-leaved yucca. A wholesome discipline is introduced by these men; the parents themselves seldom punish their children. Sometimes a child may have a dislike for his morning porridge for instance, and in such a case the Săveyo Sendo call for a brimming bowl and stand over the child until every spoonful is gone.

This song about the Săveyo Sendo is sung as a lullaby to children four or five years of age. As in the preceding example the child's name may be interpolated.

Stop crying! Go to sleep, my little boy,  
Primrose.

That Săveyo Sendo will take you if you cry.  
Over there he will chew you, if you do not  
stop crying;

Right now he will chew you, if you do not  
stop crying.

That Săveyo Sendo in his bag he will put you.  
Stop crying! Go to sleep, my little boy,  
Primrose.

Over there he will take you, then I will be  
crying!

Very thick now are the leaves of the cotton-  
wood;

Very thick now are the leaves of the willow.

There he will take you in under the willow.

That Săveyo Sendo, his teeth we all fear.

Over there now, if you do not stop crying,

Over there now, on the crest of the mountains,

Those Săveyo walk and they hear every  
sound.

And there in the mountains that one he will  
take you

Where now they are taking the big boys and  
girls.

Other lullabys threaten the child with being carried off by a coyote and forced to live on juniper berries. They dilate on the stony paths for bare feet, the thorns that tear the little garments, the heat of day and the cold of night, and the mourning of the playmates and of the parents for the little boy that will never find his way home again.

When I asked whether it was considered wise to frighten children in this way, my interpreter, who was the mother of six children, answered very properly that no child could be frightened seriously when in its mother's arms. No doubt the Tewa child looks upon the Săveyo Sendo with the same delicious trembling that we ourselves used to feel when hearing of the dangers of Jack in the giant's house.

Among the songs of labor are "grinding songs" sung by the women and girls as they bend over the metate. Then there are the "shouting songs" which the men sing in the fields and about the village. The hunting songs are, as has been stated, primarily magical and do not come in for discussion. Certain dances are of a purely social nature and may be begun at any time. Most of the songs used in these dances do not have words. Concerts by the men are sometimes arranged, usually at grinding "bees."

The grinding songs are various. Some relate to the Corn Girls, the Corn Youths, and other personages that enliven the myths, and some comment upon the sprouting leaves, the flowering meadows and other pleasing aspects of nature. Many are love songs pure and simple, while others are rather cynical reflections on the instability of love and the hardness of life. Some are humorous songs. It is pretty clear that the Tewa formerly had definite sequences in girls' grinding songs that covered all times of

the day and year. I was not fortunate enough to get one of these sequences. The grinding songs are sung to keep time with the grinding. If there is any peculiar rhythm in them as a result of this, it is brought out by an analysis of the music rather than of the words.



*Photo by Walton*

As an example of a grinding song, we have this simple song of good humor:

There by the river runs a little rabbit  
Why did you not catch him?  
Why did you not kill him?  
We feel just like doing that.  
Bent over like a little old man  
Off he goes with a watermelon;  
Bent over like a little old man  
Off he goes with a muskmelon!

A love song that has a universal appeal is the following one which is a favorite with Tewa girls. It is sung by two or three who bring their corn to the same house so they can grind together.

That somebody, my own special one,  
Even his shadow and his voice are loved.  
His footfall even! But what can I do?  
That other one, O how I hate his shadow!  
His shirt is fine and white, his hat is gray,  
His leggings and his shoes are beaded bright,  
His neckkerchief is gay and yellow — but  
For all his clothes, his face, his face is black!

Many songs that are associated with individuals were doubtless extemporized to fit a special occasion. Many love songs have a little story connected with them telling the conditions under which they were originally sung. As an example of a song associated with an individual we may take this bit of cynical observation which is accredited to a man named "Thamu" or "Dawn" who lived in Santa Clara within the memory of the oldest people. When he found several girls grinding corn and singing about their lovers according to custom, he would tell them, "This is the way you should sing about your lovers":

Alas! this man of mine!  
His words were like truth  
When he talked to me.  
His words were like truth,  
But right away he proved  
To be an arrant liar!

After this he would find safety in flight.

One example has already been given of the homesick songs sung by the young people who are away from home. Here is another one relating to the Pueblo of San Juan:

In San Juan I wonder how my home is,  
Surrounded by green cottonwoods my home  
is.

Now I remember all and now I sing!  
Now I remember how I used to live  
And how I used to walk amid my corn  
And through my fields. Alas, what can I do!

Sometimes in the songs of this simple people there is an artfulness that takes you by surprise. Who can doubt that the young girl who sang the following lyric about her lover had a secret thought to comfort her?

Oh, somewhere yonder in the west  
You go away to gather wood.  
And now you shout and now you sing.  
Oh yes, I remember! Abruptly you left me!  
Laughing was I, nevertheless, you left me!

The gentle raillery of these verses might be contrasted with the unmistakable sarcasm of another girl whose whilom swain returns from a far country and seeks to reestablish the old relations. The song takes the form of a dialogue as do several others that I obtained.

He speaks:

Oh, Little Blue, at your door I wish to be,  
At your door that once was blue and open wide,  
But now is closed. At your door, I wish to be  
Oh, my little breath! Oh, my little heart!

She speaks:

To Comanche girls you paid those words,  
those eyes!  
Your wish concerns me not and I can't be killed  
For that! It was under guns that you dared to pay!

It may be explained to those who do not catch the figure of speech that the girl's name was really *Povi tsâ wä i*, that is, Blue Flower, and that the blue about her door was the flower after which she was named. The last sentence in the girl's high-spirited answer, "It was under guns that you dared to pay" means, of course, that he took an open risk of losing her when he turned his attention to others.

Songs of disillusion, supposed to be sung by young persons soon after marriage are a common type. The woman is usually the complainant. She tells how a few short weeks before she wore



Photo by Walton

her gayest dress and went along by the side of her "arm-holding mother" while the man in brand new clothes followed by the side of his "arm-holding father." But the marriage ceremony over, gay dresses became a thing of the past. She continues in this fashion: "Now in the morning you wrap yourself in a

ragged blanket when you go down to wash your face in the brook and I cover my head with a tattered shawl when I go into the village. You promised to go to Texas and send me checks and money but you got no farther than Truchas when you grew homesick and turned back. But I don't care! If anyone should find me crying around the corner of the house and should ask me what the matter is, I would answer: "Oh, it is nothing, I have only been kicked by a goat."

This is another song of disillusion, less circumstantial but no less bitter.

Long ago how nice was everything!  
Fat mutton was all I ate,  
Coffee and sugar were all I ate,  
But now all I eat is the whip!

I have no compunction in saying that the violence was doubtless of the purely

theoretical sort. This final beautiful and vivid poem I give as the type of true love song of the Tewa:

My little breath, under the willows by the  
water side we used to sit  
And there the yellow cottonwood bird came  
and sang.

That I remember and therefore I weep.  
Under the growing corn we used to sit,  
And there the little leaf bird came and sang.  
That I remember and therefore I weep.  
There on the meadow of yellow flowers we  
used to walk.

Oh, my little breath! Oh, my little heart!  
There on the meadow of blue flowers we used  
to walk.

Alas! how long ago that we two walked in  
that pleasant way.

Then everything was happy, but, alas! how  
long ago.

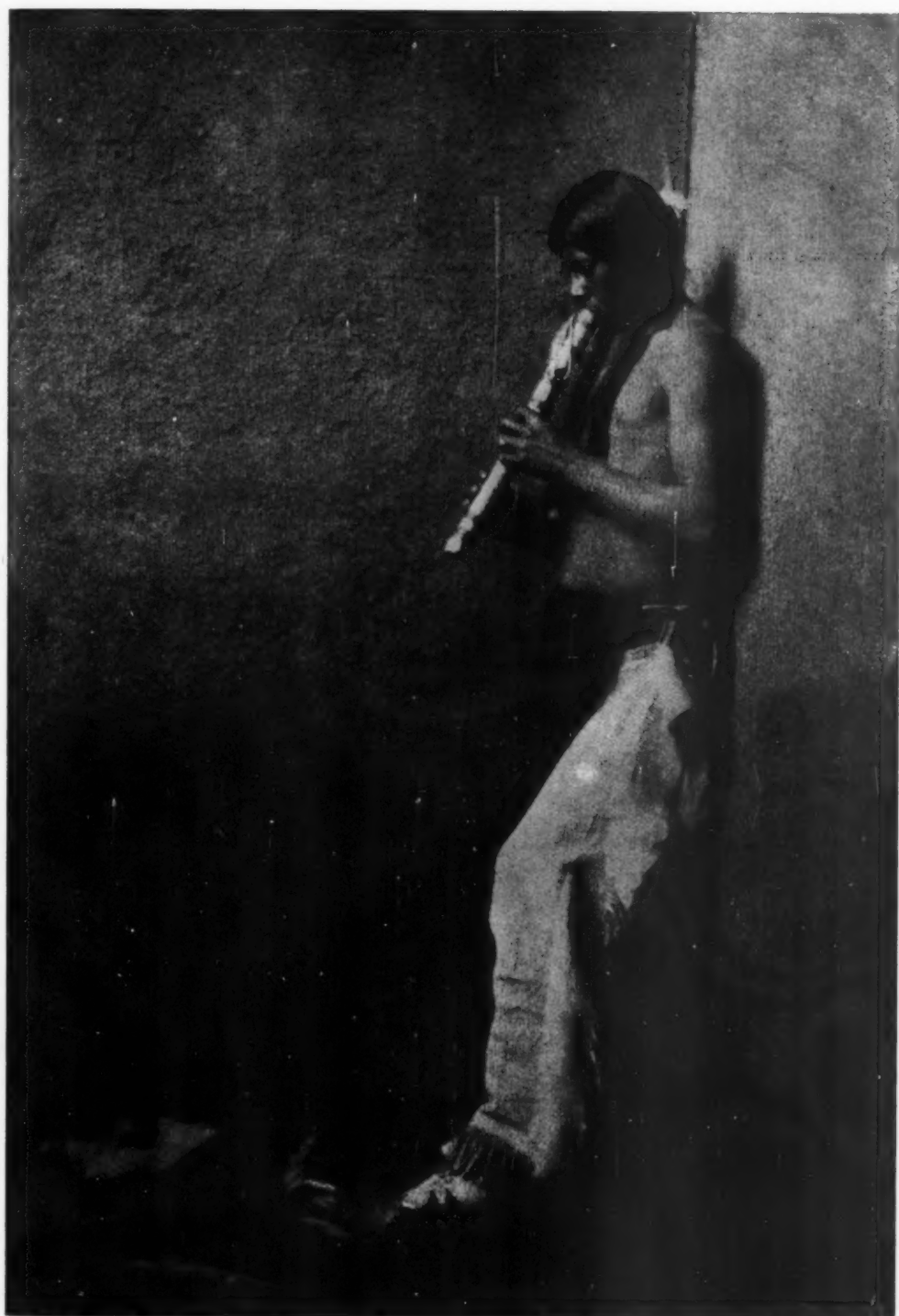
There on the meadow of crimson flowers we  
used to walk.

Oh, my little breath, now I go there alone in  
sorrow.



The sacred lake of the Taos Indians<sup>1</sup>

<sup>1</sup> NOTE BY THE AUTHOR: The Indians of New Mexico and Arizona are of two kinds, nomadic and sedentary. The latter are called Pueblo Indians after the Spanish name for village. Art, religion and everyday life vary little from one of the twenty-five or more villages to another, although four distinct language stocks are represented. The Tewa speak a dialect of the Tañón language stock and inhabit five villages (San Juan, Santa Clara, San Ildefonso, Nambé and Tesuque) along the Rio Grande north of Santa Fé, and one, Hano, in northern Arizona. Taos is a finely preserved pueblo in northern New Mexico whose inhabitants speak a different Tañón dialect. The Hopi villages adjoin Hano and have been only slightly affected by European contact.

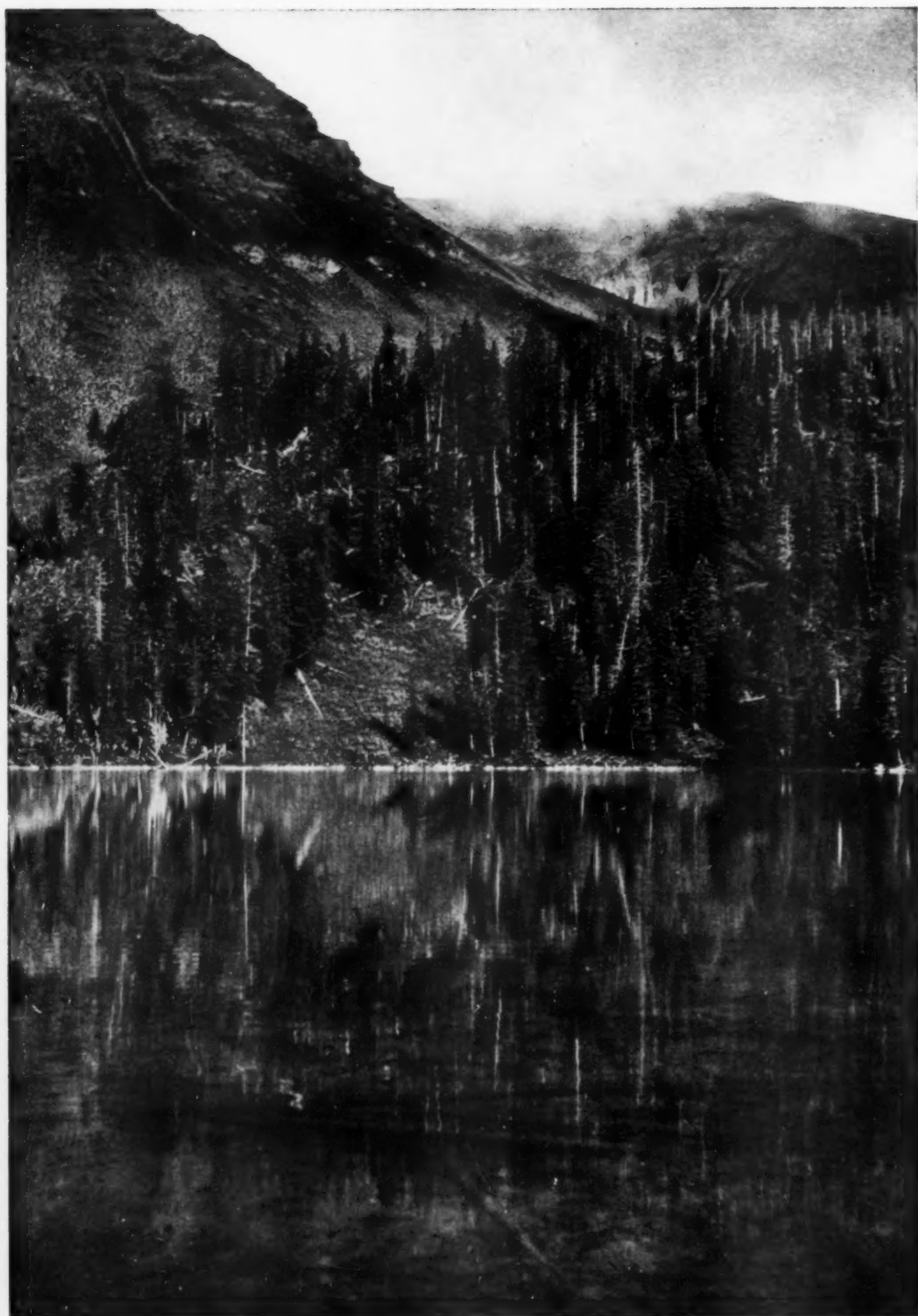


### TAOS FLUTE BOY

The flute is the Indian instrument of the serenade

*Photo by Karl Moon*

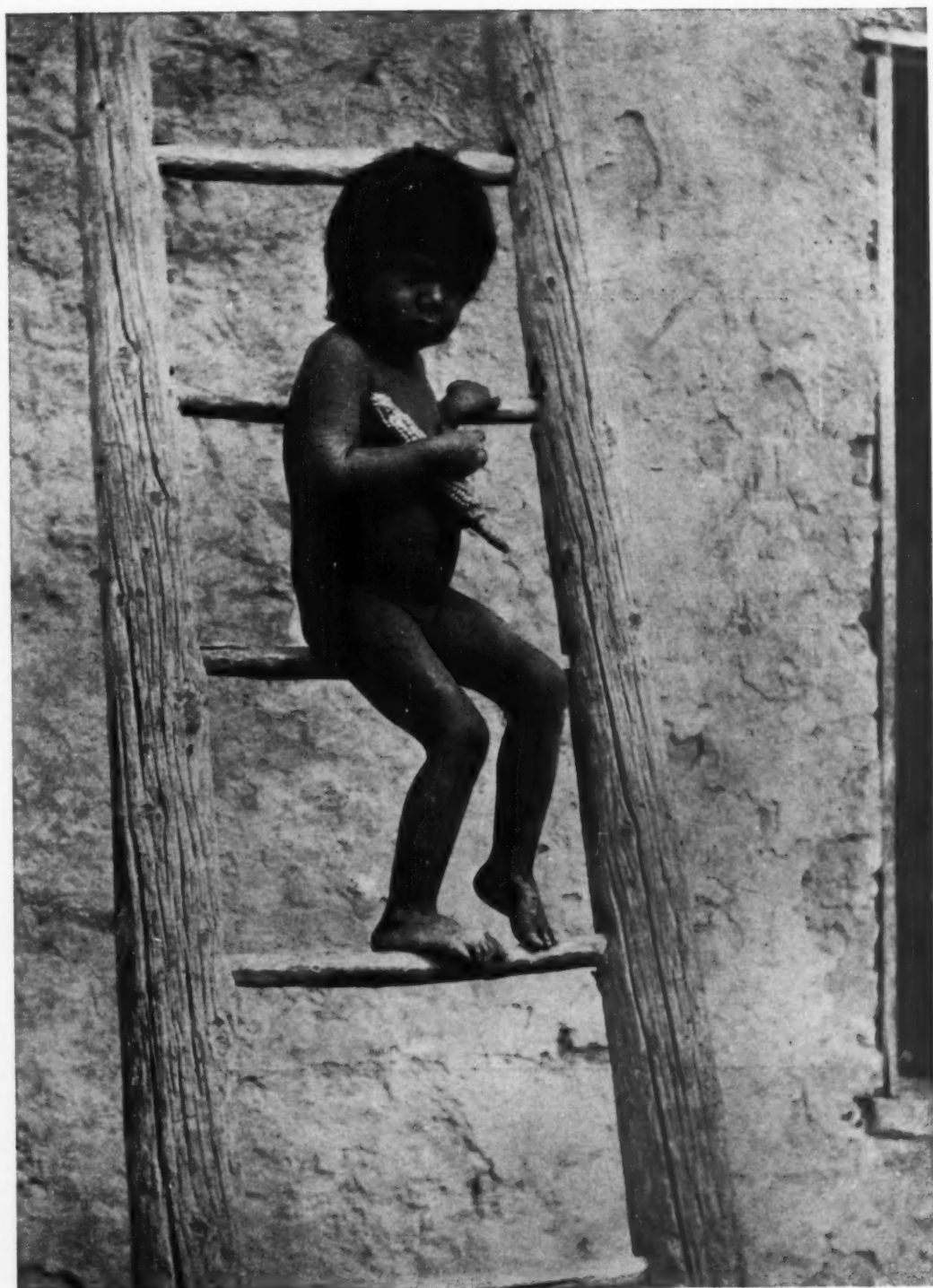




*Photo by H. J. Spinden*

### SACRED LAKE IN TAOS MOUNTAINS

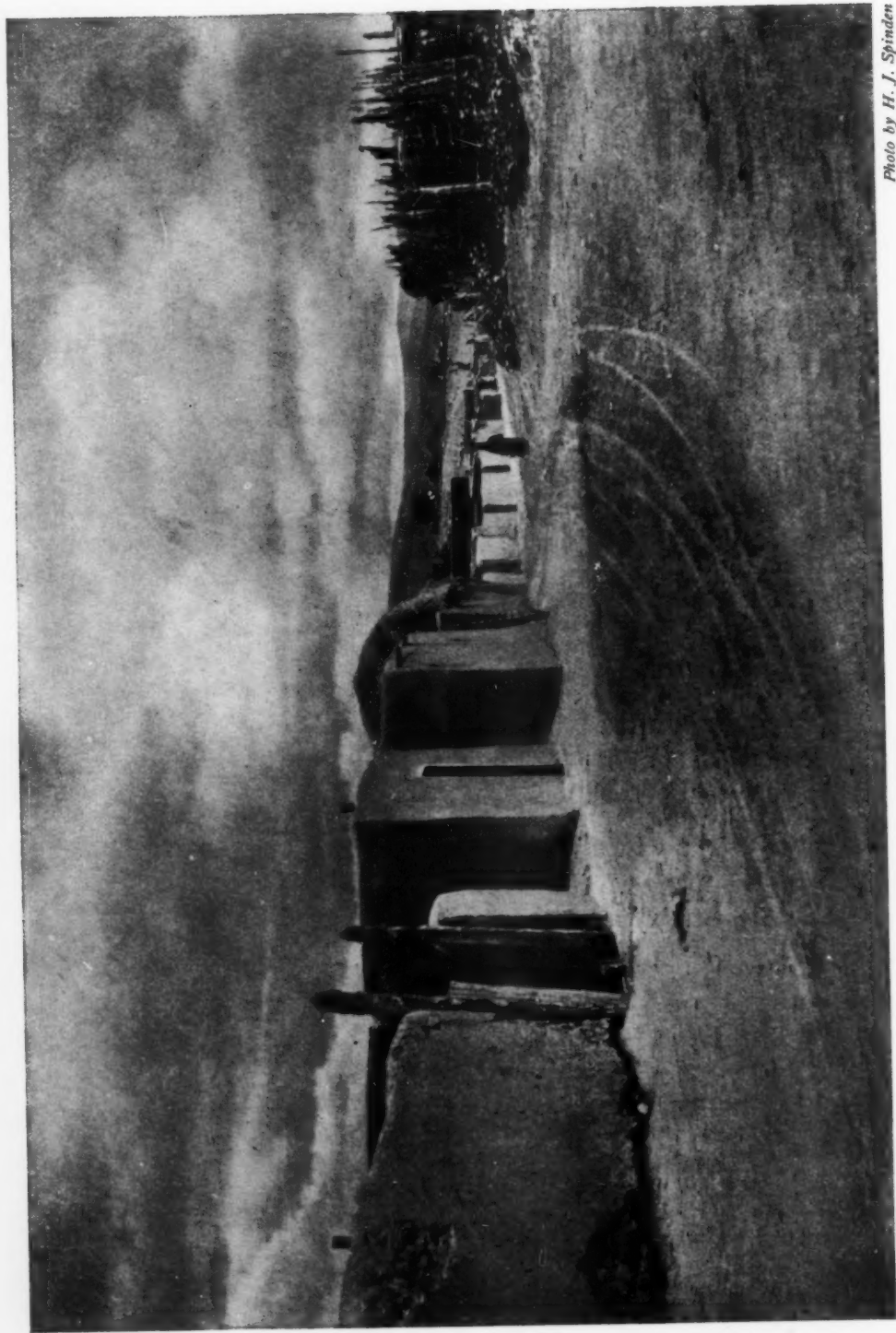
A small glacial lake 11,000 feet above the sea, where the Indians hold sacred ceremonies. All Pueblo Indian tribes have sacred lakes although not many are so beautiful as this



*Copyright by Frederick I. Monsen*

### HOPI BABY

Hopi children when very young play about on the flat roofs of the houses and adventurously climb the ladders leading thereto



*Photo by H. J. Spinden*

## THE PUEBLO ON THE VALLEY ROAD

The Santa Fé Mountains in the distance



*Photo by Karl Moon*

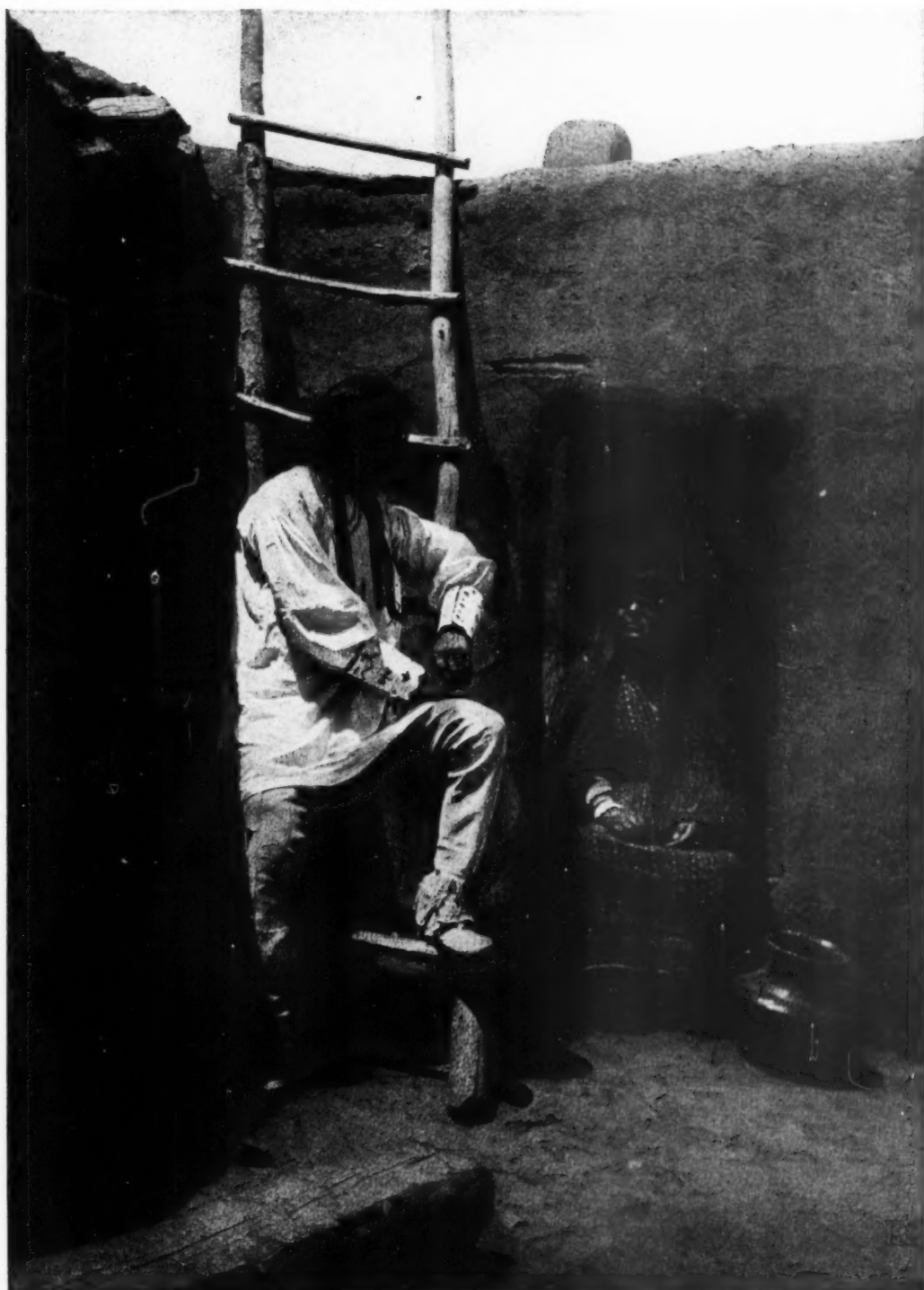
HOPI GIRL GRINDING CORN



*Photo by Karl Moon*

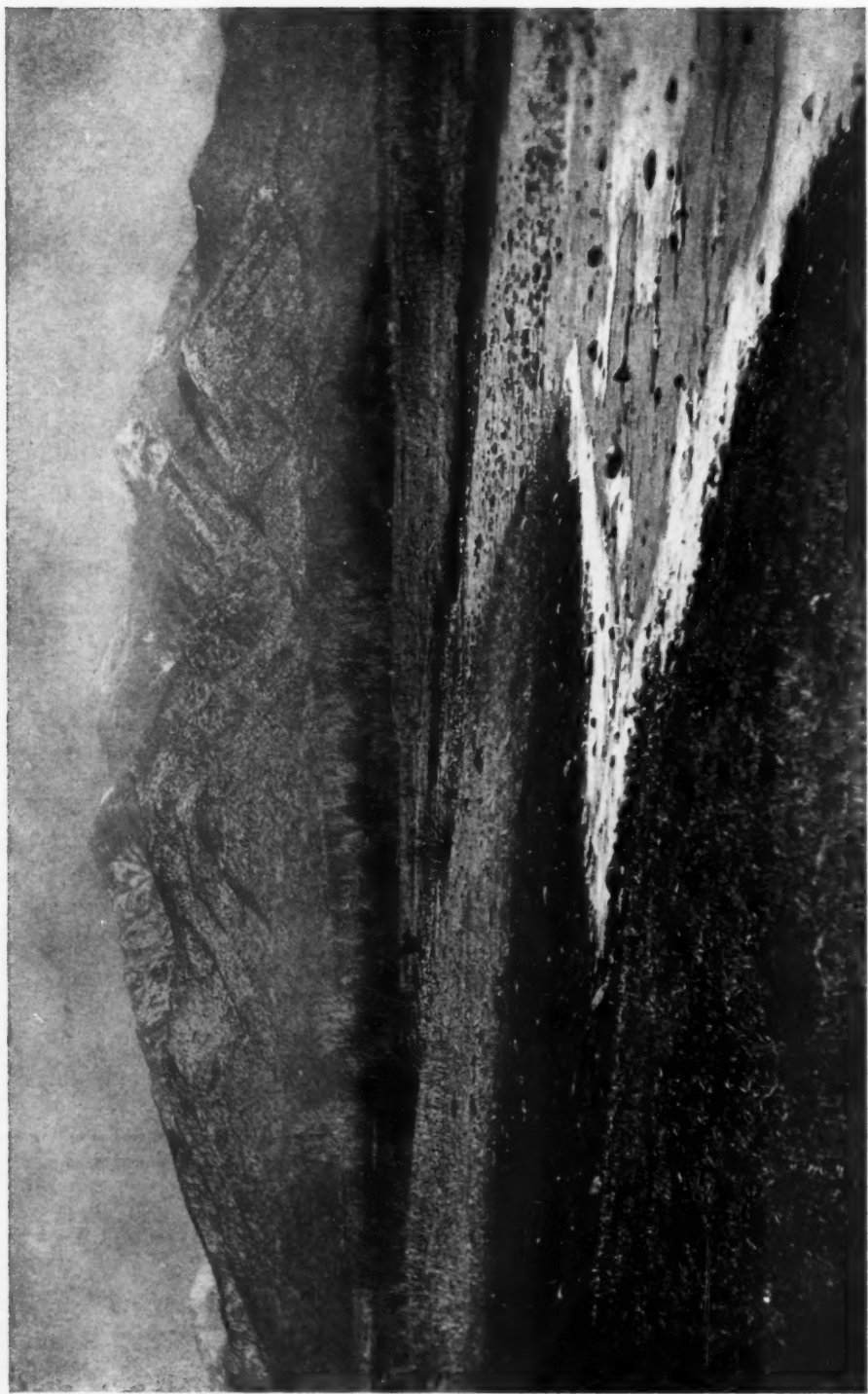
AT THE BRIDGE — San Juan Pueblo





INDIAN COURTSHIP — San Juan Pueblo

*Photo by Karl Moon*



*Photo by H. J. Spinden*

### TAOS MOUNTAIN

In one of the high cañons is a refuge to which the Indians have fled when attacked by Spaniards at various times during the three hundred years of Pueblo history. The last time was in the Mexican war of 1847

## MEMORIES OF PROFESSOR BICKMORE

By L. P. Gratacap

THE death of Professor Albert S. Bickmore<sup>1</sup> of the American Museum seems to mark in the development of the institution the completion of a period which encloses the earliest steps in establishment and a later era of unrivaled enlargement, while ushering in the present day of scientific ambitions and, it might so be called, of scenic animation. To-day research embraces continents and their zoölogical and ethnological relations, while the intensive study of the past contributes new revelations of evolution, yet with even foot, the skill of installation, the recording power of the artist, preparator and naturalist advances, filling the museum halls with exquisite pictures of life. The scenario has become the whole wide world, the drama all that lives and breathes in it, and the composer he or she who understands that life and reproduces it with tenderness and skill.

On one who has lived through simpler days, when however ardor was not less patient, accomplishment not less difficult, days wherein a certain humility of hope accompanied effort, the present produces a really bewildering impression. It is all so different, so — as Dominie Sampson might have said — “prodigious.”

The foundation of all this superstructure of activity and recreation was

laid by one whose death the Museum mourns to-day. Compared with the ample provisions of room and light — not inconsiderably associated with bodily comforts and relaxations — enjoyed now in the Museum, that cramped, little, low-ceilinged attic room in the old Arsenal where Professor Bickmore worked, over half a century ago, seems paltry enough. There was charm in the outlook from this attic room's windows over the ornamented stretches of the park below, but usually the windows were not quite clean enough to see through or the clustering leaves of climbing ivy effaced them. Crowded along the walls were the Professor's books and at a small desk in the center the Professor sat and wrote, not bulletins or erudite lucubrations, but appeals, summonses, plans, reports, his agile pen skimming over page after page of foolscap as he exhorted a trustee, reminded the mayor, pleaded to a legislator, implored a possible benefactor, or reproached a member for his unpaid dues.

Professor Bickmore at that time executed a composite rôle — and those were not days of the obedient typewriter, the unfailing telephone, of superintendent, curator, secretary, trustee, designer, and although he had assistance, his vibrant energy vitalized and controlled everything.

This paper written from a past dimly realized by the younger men of to-day, can neither consider the historical phases of the Museum's inception and growth, nor can it assume a biographical character in regard to Professor Bickmore's later years and conspicuous success in

<sup>1</sup> A memorial meeting in honor of Albert Smith Bickmore was held in the auditorium of the American Museum of Natural History on Friday, January 29. Addresses were made by President Henry Fairfield Osborn, Honorable Joseph H. Choate, Mr. Cleveland H. Dodge, Dr. J. H. Finley and Mr. L. P. Gratacap. Quotations from these addresses will be presented in a later issue of the JOURNAL.

educational fields. For the reason of emphasis, it must be limited to those initial moments of preparation within the walls of the Arsenal in Central Park, and must recall the first personal impressions of a man who imbedded, as it were, his life and talent in this institution; it will revive the memory of an intimacy as it first began, under circumstances half humorous and half serious, in an environment that gathers from a reminiscent affection for it, a charm both whimsical and sad.

The Arsenal is externally to-day the same picturesque structure as it was then — the confession of what *then* implies need not be too curiously asked — but it has, I understand, undergone extensive renovation and I trust that that antique atmosphere which once assailed the visitor, has been modernized or banished. In spite of their remote elevation the top rooms of the old Arsenal were the most cheerful parts of the ancient building, almost the most interesting, for there was the library from Dr. John C. Jay (with which came to the Museum his celebrated and historic collection of shells); there was Dr. Draper and his whirling, rotating, automatic meteorological recorders, and there too, an amazing southern colonel, Dr. Draper's assistant, whose smooth loquacity always gained a fine dignity by a slight — O! very slight — admixture of Vergilian phrases. As for instance, when he descended those abominably steep winding stairs that led up to the attic eyrie, he muttered, "*Facilis descensus Averni*" and when he painfully, under excruciating protest of rheumatism, climbed them he less contentedly exclaimed, "*Hic labor, hoc opus est.*" There too, after you had crossed a dim room, piled with boxes and desolate with dust, you found in a tower apartment, almost cheerful in its half comfortable seclusion,

the Professor; found him, as I found him, studying plans, drawing forecasts, calculating possibilities for the great new structure that was growing in Manhattan Square at Seventy-seventh Street and Eighth Avenue, itself a new fact in the steady civilizing process of the city northward.

My very first impression of Professor Bickmore, studying him with a keen sensitiveness to outward signs, was of admiration for his verbal facility. Almost instantly he plunged headlong into that incessant preoccupation of his mind, the new Museum building, its future, its uses, how it should develop, how it would feed school, college and university, how it must rise to the occasion of its new responsibilities illustrating to zoölogist, botanist, geologist and engineer the vital facts of their professions, how to the plain man it would be a page of revealing wonders, to the artist a new incentive for his creative or copying industry, how it should become focal in relation to all the scientific activities of the city, how pride in it would gather to its support financial adequacy and how it would expand commensurately with the new continent's metropolis, until it outrivaled — so it seemed to me — the collective shows of all the world.

Of course it quite took my breath away, and hopelessly incompetent to stem the flow of this splendid prophecy [Is it not to-day being fulfilled?], I suggested that he look at my letters. They were reassuringly signed by Egleston, Chandler and Newberry; the Professor did look at them, read them attentively, and actually became contemplative and silent. An instant later, almost eagerly, he invited me to luncheon. I have always felt that, coming from the School of Mines at Columbia, my application struck him favorably as significant of the approaching capitulation of that

university to the monopolistic designs of the Museum.

Well, that first impression grew inordinately. There was an unmistakable Napoleonic strain in the Professor's make-up, and more and more clearly I saw that his unflagging industry, his unshakable resolution was supported by an almost sublime optimism. Perhaps there he was not altogether Napoleonic, for with the great consul the fatalistic shadow darkened many a sombre hour. The commentary of the poet on human hopes, "One moment seen then gone forever," had no meaning to Bickmore, at least in his waking and working moments. Once seen, his designs were potentially realized; he never met himself coming back. And then he temperamentally possessed wonderful resiliency. Of course there were reverses, repulses even, but if a clumsy image may be permitted, expressed in terms congenial to modern scientific linguistics, after every differentiation Professor Bickmore integrated so rapidly that you never discovered he had been pulverized.

There were proud moments too in the old Arsenal. Reception days were really momentarily fashionable. The large upper hall with mammals and birds and skeletons, rather crowded, but luminous and interesting, the subterranean (as regards light) second floor, with more skeletons, snakes, alcoholics, building stones, corals and shells, both overflowed with a gallant company of young and old, somehow evoked by the Professor's own enthusiasm and by the social prestige of the trustees, amid whom the Professor with gaiety and confidence spread his roseate predictions. Music swelled from one of the tower alcoves, and an effective corps of reporters, assiduously entertained also by the Professor, duly recorded the wonders of the place and the splendor of the company. These

receptions were successes and they efficiently helped the lengthening list of members. They kept the Museum *idea* before the great public and Professor Bickmore intended to make and succeeded in making that great public understand the meaning of the new design more and more as the event of its dedication drew nearer.

The transference of the contents of the Arsenal to the new building on Manhattan Square was itself accomplished with amazing rapidity and here again the unequivocal impetus of the Professor was manifested. By a Fabian stroke of prudence he maintained his hold on the Arsenal by keeping there a much diluted mixture—it must be confessed—of museum properties or exhibits, which however still further assisted his designs, as all visitors, always numerous because of the proximity of the Park menagerie, met a repeated exhortation to cross the park to see the "real thing."

Already the Museum had taken on a quasi-national reference, for had not President Grant laid its cornerstone; and now President Hays, himself a storm center of political dispute, was to open its halls with the added intellectual decorations of President Elliot and Professor Marsh as speakers and promoters! The glory of that occasion need not divert these lines from their simple purpose, but I do recall its immense excitement wherein by an odd trick of association, the clearest visual memory is that of the President's wife, a lady whose tact and charm had already captivated the nation, and that of Professor Marsh, vexed over the absence of a looking-glass for the regulation of his not over-abundant hair.

In regard to the friends who have departed this life, it is all too easy to succumb to the temptation of adulation, but, so far as the American Museum of



Natural History is to-day a most impressive fact, the history of its origin, of its development, of the growth of its later vital educational influence, is indissolubly part of the life of Professor Albert S. Bickmore. Inseparable factors in the institution's astonishing success were his enduring hopefulness, the prescience that foresaw the boundless opportunities for the Museum's growth in this city of equally boundless prospects, the incessant watchfulness that nursed its first years into the self-sufficiency, at least of adolescence, his industry, his power of audacious importunity, the manipulative skill of the politician and the skillful ardor of the eulogist, and perhaps lastly the magnificence of his vision of possible ultimate attainments.

Certainly there were other elements, other minds and personalities, other influences even, but — when there is fame enough for all — let no invidious suspicion be permitted to lessen by the smallest scruple the full measure of Professor Bickmore's merit.

Finally, Professor Bickmore from the beginning I think, fully appreciated the scientific rôle the Museum would assume. It was by his strenuous exertions that the great Hall collection of fossils was purchased which gave the Museum a unique distinction in invertebrate palæontology. Very shortly after the occupation of the new building, he secured the

location in it of a section for the United States Geological Survey, represented by Arnold Hague, Charles D. Walcott, Joseph P. Iddings and the mining geologist, T. B. Brooks. The Zirkel collection of rocks from the 40th parallel survey was then deposited in the Museum, probably the first extensive petrographic assemblage of slides and field specimens made in this country. These were subsequently at the Museum, studied by Mr. E. Wadsworth, and gave rise to a very pretty altercation, as many lithologists may recall. Professor Bickmore, I know, entertained, with Clarence King, the idea of building electrical furnaces in the basement of the new building, which might have anticipated some of the startling successes in modern electrolytic chemical processes. He conferred with Asa Gray on the project of removing to the Museum the Torrey Herbarium; I was present when he suggested to Professor Chamberlain that the Geological Society of America make its headquarters at the American Museum, and again and again he spoke to me exultingly of a project to transform the first floor of the new building into an immense aquarium. Many of these plans were indeed premature and overstated, but they evinced the fertility of Professor Bickmore's mind, and illustrated his resourceful propaganda in all directions in the interests of the Museum.

## MUSEUM NOTES

SINCE the last issue of the JOURNAL the following persons have become members of the Museum:

*Life Members*, MESSRS. LEWIS SAYRE KERR, JR., SAMUEL KISSAM KERR and SEWELL TAPPAN TYNG;

*Annual Members*, MRS. ALFRED NOROTON PHILLIPS, MRS. JULIA SELIGMAN, MRS. ALICE E. SHOENBERGER, MRS. FITCH W. SMITH, MRS. JENNY K. STAFFORD, MRS. DAVID MCNEELY STAUFFER, MRS. S. M. STROOCK, MRS. GUSTAVUS A. WALKER, MRS. ISIDOR WORMSER, the MISSES E. J. BARNARD, LOUISE G. CRABBE, CHRISTOBELLE CRAIN, EVA HAWKES, EMMA FELLOWES TAYLOR and EVELYN M. THOMSON, DR. JOHN B. KNAPP, and MESSRS. OTTO T. BANNARD, ARTHUR CLEVELAND BENT, JOHN W. A. DAVIS, THEODORE G. EGER, LEOPOLD F. GOELLER, GEORGE A. HOLDEN, EDWARD M. HOUSE, FAY INGALLS, WILLIAM MICHAELIS, FREDERICK H. SANBORN, DONALD SCOTT, ABRAHAM SHIMAN, WILLIAM SKINNER, ROCHESTER B. SLAUGHTER, FREDERIC E. SONDERN, ARTHUR P. STURGES, HOWARD TAYLOR, MYLES WALSH, EUGENE W. WATKINS, and T. W. WILLIAMS.

MR. H. E. ANTHONY, accompanied by Mr. David S. Ball as assistant, left New York January 29 to join Mr. W. B. Richardson in southern Panama for a four month's collecting trip. There is little known zoologically of the high mountainous region between Colombia and Panama, and the results of the expedition must prove of unusual interest in showing a possible connecting link between the extinct fauna of North and South America. The party hopes to secure a representative collection of the birds and mammals of the region, which will serve to connect the Museum's recent work in Colombia with the earlier work done in Central America. The expedition hopes also to round out the Museum's accessions of mammals and birds so that they include a practically continuous collection from Mexico down into Peru.

THE JESUP LECTURES will be given in the auditorium of the Museum on Friday evenings during February and March, from February 5 to March 25 inclusive. In these lectures, Charles P. Berkey, associate pro-

fessor of geology in Columbia University, will speak before the friends of the University and of the American Museum of Natural History on the "Origin and Meaning of Some Fundamental Earth Structures." The subjects of the individual lectures follow one another as follows: February 5, "Concerning the Origin and Nature of the Earth"; February 12, "Earth Movements"; February 19, "The Place and Work of Volcanism"; February 26, "Metamorphism"; March 5, "Primary and Secondary Structures"; March 12, "Petrographic Cycles"; March 19, "Application to Local Studies"; March 26, "Relation of Structural Geology to Practical Undertakings."

THE American Ethnological Society in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences met on January 25, at the American Museum of Natural History. Rev. John W. Chapman presented a paper, "The Medicine-Men of Anvik, Alaska," and an informal discussion followed. Some of the questions asked were referred to Mr. Thomas Reid of Anvik, Alaska, an educated half-breed who was visiting the Museum at the time to follow out certain studies in the anthropological department.

APROPPOS of the visit of Sir Douglas Mawson to the Museum, it may be noted that the map of the South Polar regions [at the foot of the stairway on the first floor] has been revised and brought down to date, so that it includes the discoveries of Sir Douglas and other recent Antarctic explorers.

THE loan collection of Dr. J. Leon Williams illustrating the skulls of the "Men of the Old Stone Age," a series of restorations of ancient types of prehistoric man by Professor J. H. McGregor, and a selected series of flint implements and works in ivory illustrating the art of the Old Stone Age, have been sent to the Panama-Pacific Exposition at San Francisco. Professor McGregor's series of restorations includes skulls and busts of the following subjects: *Pithecanthropus erectus*, the Neanderthal race and the Piltdown man, besides reconstructed brain casts of these stages.

THE evolution of the vertebrates is set forth in a general way in the exhibition halls of the Museum, but the subject covers such an extended field of detail that the casual visitor would hardly be likely to grasp the main outlines. Indeed it requires considerable technical training to give an accurate account of the general stages in the evolution of the skull of vertebrates from the lowest fishes to man or to follow the transformation of the teeth and jaws as they are diversely modified for different functions from primitive or generalized types. Perhaps it is still a matter of general interest and it is deemed still worth while that a few specially equipped students should work out for themselves and in detail the steps by which the human backbone and limbs have been evolved from lower types. Such topics are developed in the Columbia University graduate courses which are given at this Museum under Dr. W. K. Gregory. A study collection comprising over one thousand selected specimens of recent and fossil vertebrates has been brought together through the coöperation of Museum curators and others. This collection has proved of constantly increasing value in the past few years not only to the graduate students in the courses mentioned but also to Museum curators and other investigators. A class from Hunter's College also makes constant use of this collection. The resources of the Osborn Library and of the Museum library are likewise used in these courses.

DR. E. O. HOVEY will sail February 5 for the West Indies to continue the studies on the volcanoes of the Lesser Antilles, which he began some years ago when the great eruptions on the islands of Martinique and St. Vincent occurred. He will be absent about three months and will devote his time particularly to the Grande Soufrière of Guadeloupe, Mount Pelé of Martinique, the Soufrière of St. Vincent and the boiling lake of Dominica, collecting gases from the fumeroles and making temperature observations, and taking note of the changes which have occurred since his visit in 1908. The expedition is undertaken through the aid given to the Museum by the Angelo Heilprin Exploration Fund established by Mr. and Mrs. Paul J. Sachs.

AN exhibition of photographs of North American Indians is to be held at the Museum from February 1 to 27. These photographs

were made by Mr. Edward S. Curtis, under the patronage of the late J. Pierpont Morgan, and include some of the largest and most striking of his recent pictures taken on the North Pacific Coast. Many of them will appear in the coming volume (Volume X) of Mr. Curtis's life work on the North American Indians.

THE autochrome plates, as exhibited by Mr. Frank M. Byerly in the Museum auditorium, January 7, proved to be a decided evidence of the success of obtaining nature's colorings by automatically absorbing the color directly from the object or the landscape. The exhibition was particularly interesting to practical workers in photography as showing the progress that has been made in the rapidity of autochrome plates and in their adaptability to use by non-professionals. Two of the most pleasing pictures were companion pieces, the first showing the clouds of a gathering storm, the second the rainbow stretching over the valley after the cloudburst. A series of flower pictures illustrated the extreme value of this art in that it loses no detail of the coloring of the original.

THE formal opening at the Metropolitan Museum of the Riggs Collection of Armor, installed under the supervision of Bashford Dean, curator of arms and armor, took place on the evening of January 25. This collection forms the most considerable gift that the Metropolitan Museum has ever received aside from the famous Rogers bequest. Combined with the collection of armor already in the Museum's possession and supplemented by loans from Dr. Dean's private collection, it makes a very full and instructive exhibit. Mr. Riggs is one of few collectors who wish their collections arranged chronologically as well as for artistic effect. It thus happens that from the present installation the student can get an excellent idea of the history of the development of armor and of its decadence and disappearance as gunpowder came in and firearms improved.

Two reels of motion picture films showing Blackfoot Indian life were exhibited to the Museum staff January 22, by Mr. E. W. Deming, who during the past summer lived in a lodge near the Blackfoot Indian camps in Glacier National Park. The pictures include various tribal dances and the ceremonies with which these dances are connected

and are perhaps unusual in being authentic unposed records. Mr. Deming returns to Glacier Park in the summer of 1915 and hopes to continue this picture record of Blackfoot ceremonies and also to obtain phonograph records of Blackfoot songs.

THERE were shown in the auditorium of the Museum on December 31, motion picture films telling the story of the rescue of the Stefánsson survivors from Wrangell Island. In June, 1914, news of the sinking of the Stefánsson exploration ship "Karluk" the previous January, and the marooning of the survivors on Wrangell Island, had been brought to civilization by Captain Robert E. Bartlett, across the ice from Wrangell to Siberia. The rescue of the survivors from Wrangell was made on September 7 by Mr. Burt M. McConnell (who but recently had been of the supporting party with Stefánsson on his ice trip north into Beaufort Sea) in the "King and Winge,"—although he would give all credit for the rescue to Olaf Swenson, commander of the "King and Winge," and to Captain Jochimsen, ice pilot. The pictures showed the "King and Winge" bucking the ice on its way to the island and the taking off of the twelve people from the flat ice-covered shores leaving only the frail tent, the flag at half-mast and the cross above the graves of the three dead, to mark what had been a camp for human beings for eight months. The pictures showed also Stefánsson, commander of the expedition, removing supplies from the "Belvedere" and later starting out on the ice trip from Martin Point; and included besides remarkable photographs of bear and walrus hunting from the decks of the "King and Winge."

At the recent session of the American Association for the Advancement of Science the following honors were conferred upon members of the anthropology staff of the Museum: Dr. Pliny E. Goddard was reelected president of the American Folk Lore Society and was elected editor of the *American Anthropologist*, the foremost anthropological publication of America; Dr. Robert H. Lowie, who performed the duties of acting secretary in the absence of Professor George Grant MacCurdy, was reelected associate editor of the *American Anthropologist*, and Mr. Alanson Skinner was elected assistant secretary of the American Folk Lore Society.

THE lectures for the blind classes in the public schools of New York City, given under the direction of the department of public education of the American Museum of Natural History, began November 12 and will continue until June 15. Two schools from Brooklyn, one from the Bronx, and eight from Manhattan are regular visitors, each class receiving individual attention, and, during the year, having from four to seven meetings at the Museum. The schedule for 1914-1915 will include simple illustrated talks on "Fur Babies and Their Ways," "Animal Life at the Seashore," "Bird Neighbors and Their Homes," "Flowers of the Springtime," "The Story of the Trees," "How the Trees Protect Themselves in Winter," "Hiawatha's People," "Inside the Indian's Wigwam," "Our Little Eskimo Cousin," "The Story of Cotton, Silk, and Wool," "A Journey from Pole to Pole," and "The Story of Animals and Vegetation of Different Climates."

A new work entitled *The Indians of Greater New York* by Mr. Alanson Skinner has been published by the Torch Press. This exhaustive study has been written to meet the constant demands of those interested in the history of our local Indians. Mr. Skinner has had opportunity to examine many of the original sources of information which were rare and difficult to procure, and has not hesitated to quote freely their quaint phraseology. The book is written in popular style and deals with the history, archaeology and ethnology of the Manhattan Indians and their neighbors.

THE department of geology has been fortunate in securing for the meteorite collection fourteen falls and finds which are entirely new to the Museum's series. The most interesting of these is an eight hundred and eleven gram slice of the Big Skookum siderite. This meteorite was found at a depth of sixty feet from the surface in the glacial gravels near the Yukon River, Alaska, and is therefore supposed to be of glacial age.

THE exhibits in the Peruvian hall have been recased to make room for the collection of Nasca pottery purchased through the generosity of Mr. A. D. Juilliard, a trustee of the Museum. This collection has been installed in two large wall cases at the west end of the hall.

RECENT additions to the hall of fossil mammals include a skeleton and a series of skulls of the clawed ungulate *Moropus*. These are part of the series of skeletons obtained by recent Museum expeditions to the great fossil quarry at Agate, Nebraska. Skeletons of the sabre-tooth tiger and the great extinct wolf from the asphalt deposit near Los Angeles, as also skulls of the fossil horse and the great American lion from the same locality are likewise placed temporarily on exhibition, although not yet mounted. Attention may also be called to the fine series of skulls in the Oreodont alcove on the north side of the hall.

THE following papers were presented before the recent session at Philadelphia of the American Association for the Advancement of Science by members of the staff of the American Museum of Natural History.

*Geological Society of America*

CHESTER A. REEDS, "Geologic Deposits in Relation to Pleistocene Man," and "Graphic Projection of Pleistocene Climatic Oscillations."

GEORGE F. KUNZ, "John Boyd Thacher Park — The Helderberg Escarpment as a Geological Park."

*Palaeontological Society of America*

HENRY F. OSBORN, "Migration and Succession of Human Types of the Old Stone Age of Europe." Presidential address before the Palaeontological Society. "The Addition and Evolution of 'Characters' in Palaeontologic Phyla."

CARLOS DE LA TORRE and W. D. MATTHEW, "Megaloenus and other Cuban Ground Sloths."

W. D. MATTHEW "On the Affinities of *Hyopsodus*."

BARNUM BROWN, "The Ankylosauridae; second contribution."

WALTER GRANGER, "New Evidences on the Affinities of the Multituberculata."

WILLIAM K. GREGORY, "American Eocene Primates"; and "On the Relationships of *Anaptomorphus*, *Necrolemur* and other extinct Lemuroids."

W. D. MATTHEW, "Reconstruction of the Skeleton of *Brachiosaurus*."

L. HUSSAKOF and W. L. BRYANT, "The Fish Fauna of the Conodont Bed (Basal Genesee) at Eighteen Mile Creek, near Buffalo, New York."

*The American Society of Naturalists*

HENRY F. OSBORN, "The Museum in the Public Service."

*The American Folk-Lore Society*

PLINY E. GODDARD, Presidential address, "The Relation of Folk Lore to Anthropology."

*American Anthropological Society*

HERBERT J. SPINDEN, "Nahua Influence in Salvador and Costa Rica."

CLARK WISSELER, "The Diffusion of Modern Ceremonies in the Plains Area," and "Types of Clothing and their Distribution in the Plains Area."

NELS C. NELSON, "Chronological Data on the Rio Grande Pueblos."

ALANSON SKINNER, "Ethnology of the Eastern Dakota."

ROBERT H. LOWIE, "Exogamy and the Classificatory System of Relationship."

*Social and Economic Science*

C.-E. A. WINSLOW, "Community Defense of National Vitality."

*Physiology and Experimental Medicine*

C.-E. A. WINSLOW, "Standards of Ventilation — Hygienic and Aesthetic."

*The Society of American Bacteriologists*

ISRAEL J. KLIGLER, "A Study of the Correlation of the Agglutination and Fermentation Reactions among the Streptococci."

THROUGH the generosity of Mr. Ogden Mills, the Museum has added to its collections a beautiful specimen of bandolier or beaded bag, secured in Fort Leavenworth, Kansas, in 1854 from the Delaware Indians.

DR. FRANK E. LUTZ, of the Museum's department of invertebrate zoölogy, has been appointed a member of the board of editors of the *New York State List of Insects*. Mr. Charles W. Leng, honorary curator of Coleoptera is also a member.

THERE have been so many calls for the moths mentioned in Gene Stratton Porter's books, *Girl of the Limberlost* and *Moths of the Limberlost* that a special exhibit of these species has been installed in the gallery case, east wing, third floor.

AMONG recent important accessions to the department of geology mention may be made of the Ysleta siderite, weighing 310 pounds, from Ysleta, Texas, and the Culbertson aërolite, weighing 13 pounds, from



Culbertson, Nebraska, the gift of Mr. Arthur Curtiss James. Neither of these meteorites has yet been described. Eight kilograms of additional material from the Holbrook stone shower of July, 1913, have been obtained for use with what the Museum already possesses, to arrange a special case in the hall of geology to represent the mode of occurrence of such a meteoritic fall. There have been secured also a slice of the Mt. Edith siderite showing particularly excellent Widmanstätten lines, and representatives of the Rio Arriba, Wairarapa, Elm Creek, Aumières and St. Marks falls. An interesting slab and its counterpart of Triassic limestone showing footprints and ripple marks have been obtained from a quarry near West Orange, New Jersey; also a slab of orbicular granite from Vermont; a series of salt and other minerals from Great Salt Lake, Utah; and a specimen of native iron in basalt from Bühl, Germany. The Albert Manufacturing Company has presented to the department an interesting series of specimens illustrating the occurrence of gypsum at its famous quarries near Hillsborough, New Brunswick.

On January 26, Mr. Roy W. Miner of the department of invertebrate zoology lectured before the Linnæan Society on "The Fauna of Our Tide Pools." Mr. Miner described with the aid of colored lantern slides the environmental conditions determining the animal life of the tidal zone of our northern rocky coast from Nahant to New Brunswick. The tide pools of Nahant, Massachusetts, with their wonderful flora and fauna were then depicted. This is the locality from which Mr. Miner has drawn the theme for the new tide-pool group which is under course of construction for the Darwin hall. Over-arched by a natural bridge of rock below the high-tide mark at the bottom of a sixty-foot cliff, this tide pool with its gorgeous display of animal and plant life presents all the aspects of a veritable fairy cavern. It is expected that the group will be finished within the current year and will form the most striking in the series of window exhibits in the Darwin hall illustrating the natural history of the invertebrates of the North Atlantic coast.

An introductory exhibition of drawings in color of "Our Common Home Birds" by Mr. H. C. Denslow was held at the Museum

in the west assembly hall from January 15 to January 29 inclusive.

A GROUP of the California ground squirrel has been placed on exhibition in the hall of public health. The significance of this exhibit is realized when we know that the flea carrying the germ of the bubonic plague to man, is common to this rodent as well as to the rat — for some years recognized as a carrier of the disease. This condition has been and still is a serious problem, as the trappers who come in contact with the animal become infected and in turn transmit the disease to other individuals. The plague has spread in the West to such an extent through this agency that the United States government has found it necessary to conduct a strenuous campaign to exterminate the ground squirrel. Up to September, 1913, nearly two thousand squirrels of this species had been found infected with the plague bacillus in California alone.

THE last shipment of South American birds and mammals sent north by the Roosevelt party, has just arrived in New York. About three hundred and fifty mammalian specimens and ninety Brazilian birdskins were enclosed. Among the specimens new to the Museum collections are three birds, the very small manikins, two male and one female.

THE groups in the Darwin hall are being provided with index labels some of which have already been installed. Those used in connection with the window exhibits which represent an extensive and complicated series of invertebrates in their natural environment, are particularly adapted to aid in identifying the forms shown. The label recently completed for the Woods Hole group describes in a series of five panels the principal marine specimens represented and identifies them by water-color diagrams placed immediately below the portions of the exhibit to which they refer.

AN eight-foot nurse shark (*Ginglymostoma cirratum*) was received from the New York Aquarium several weeks ago, and a plaster mold of it was made while it was still in good form. This is now being prepared in the taxidermist workrooms of the Museum, and will make a valuable addition to the series of large fishes mounted along the walls above the cases in the hall of recent fishes.

On the afternoons of January 22 and 29, Mr. Alanson Skinner who is honorary curator of anthropology of the Staten Island Association of Arts and Sciences, delivered two lectures for children, "Life Among the Indians" and "Indian Fairy Tales," at the Association's Museum at St. George.

THERE has been placed on exhibition in the hall of North American mammals a small group of pikas, a small rodent called by many names, such as little chief hare, rat hare, cony, and known also as the "starved rat" among hunters and miners. The pika belongs to the only living genus *Ochotona* of its family (Ochotonidæ). *Ochotona alpinus* and *Ochotona ogotena* are found in Europæo-Asiatic altitudes of from 11,000-14,000 feet among the northern mountains. They are found along the Volge and Ural rivers, through the steppes of Orenburg, in the Ural mountains, and in western Russia including districts along the Obi River, around Lake Aral, and through the steppes between the Obi and Volga rivers. *Ochotona saxatilis* is found in North America and it is a group of this species that the Museum owns. This particular pika comes from Estes Park, Colorado, but the American pika is also found in all the western mountains, is especially abundant on the Snowy Range in the vicinity of the Platte River (in southern Wyoming and northern and central Colorado), and inhabits regions even as far south as New Mexico and Arizona.

The pika exhibited is a small gray-brown rodent resembling a guinea-pig except that it is never longer than seven inches and has large, short, rounded ears. It frequents dry rocky places almost destitute of vegetation, living upon sappy plants and the twigs of bushes in summer, and in winter upon the grass which it has stored between the rocks of its home during the summer. It is found almost always at higher altitudes than any rabbit lives, from the timber line up to the line of perpetual snow.

MAPS have been placed at the entrances of the North Pacific Coast hall and the Eastern Woodland hall showing the location of

the important tribes of Indians in North America north of Mexico. These tribes have been grouped into nine culture areas as recently plotted by Dr. Clark Wissler. An index accompanies the maps, not only for the purpose of indicating the location of the tribes on the map but also to serve as a guide to the collections on exhibition in the four halls devoted to North American ethnology.

AN instructive new exhibit to illustrate the relation of animals to environment has recently been placed in the synoptic hall of mammals. It consists of a map of the United States on which are fastened the actual mounted skins of various species of chipmunks to call attention to the fact that in arid regions these chipmunks are small and pale in color while in forested moist regions they are large and dark-colored — in accordance with the law formulated by Dr. J. A. Allen.

A RECENT important acquisition in the department of geology is a slice of a meteoritic iron known as "Sams Valley". This meteorite was originally found in 1894 but was not brought to the attention of the Museum and scientific world until twenty years later. The entire mass was a small one, weighing only about fifteen pounds. The Museum however has been fortunate in securing an entire section weighing 1093 grams and measuring about 6½ by 4½ inches. The polished and etched surface of this meteorite is particularly beautiful through the abundance of the mineral schreibersite which is present in small masses and broad thin plates, the latter showing on the etched surface as slender rods and the thin lamellæ of nickel-rich taenite. The latter are prominent in certain lights as brilliant lines. This meteorite receives its name from the post office of Sams Valley near the locality where it was found. Its nearest geographical neighbors among the siderites are Willamette two hundred miles to the north in Oregon, and Oroville two hundred miles to the south in California, both of which are entirely different from Sams Valley in appearance of the etched surfaces.

# The American Museum of Natural History

Seventy-seventh Street and Central Park West, New York City

Open free to the public on every day in the year.

The American Museum of Natural History was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people. It is dependent upon private subscriptions and the fees from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world. The membership fees are,

Annual Members.....	\$ 10	Patrons.....	\$1,000
Sustaining Members (annually).....	25	Associate Benefactors.....	10,000
Life Members.....	100	Associate Founders.....	25,000
Fellows.....	500	Benefactors.....	50,000

**Guides for Study of Exhibits** are provided on request to members and teachers by the department of public education. Teachers wishing to bring classes should write or telephone the department for an appointment, specifying the collection to be studied. Lectures to classes may also be arranged for. In all cases the best results are obtained with small groups of children.

The **Museum Library** contains more than 60,000 volumes with a good working collection of publications issued by scientific institutions and societies in this country and abroad. The library is open to the public for reference daily — Sundays and holidays excepted — from 9 A. M. to 5 P. M.

The **Technical Publications** of the Museum comprise the *Memoirs*, *Bulletin* and *Anthropological Papers*, the *Memoirs and Bulletin* edited by J. A. Allen, the *Anthropological Papers* by Clark Wissler. These publications cover the field and laboratory researches of the institution.

The **Popular Publications** of the Museum comprise the *JOURNAL*, edited by Mary Cynthia Dickerson, the *Handbooks*, *Leaflets* and *General Guide*. The following list gives some of the popular publications; complete lists, of both technical and popular publications, may be obtained from the Librarian.

## POPULAR PUBLICATIONS

### HANDBOOKS

- NORTH AMERICAN INDIANS OF THE PLAINS. By Clark Wissler, Ph.D. *Paper*, 25 cents; *cloth*, 50 cents.  
 INDIANS OF THE SOUTHWEST. By Pliny Earle Goddard, Ph.D. *Paper*, 25 cents; *cloth*, 50 cents.  
 ANIMALS OF THE PAST. By Frederic A. Lucas, Sc.D. *Paper*, 35 cents.

### ILLUSTRATED GUIDE LEAFLETS

- GENERAL GUIDE TO THE COLLECTIONS. New edition issued December, 1914. *Price*, 25 cents.  
 THE COLLECTION OF MINERALS. By Louis P. Gratacap, A.M. *Price*, 5 cents.  
 NORTH AMERICAN RUMINANTS. By J. A. Allen, Ph.D. *Price*, 10 cents.  
 THE ANCIENT BASKET MAKERS OF SOUTHEASTERN UTAH. By George H. Pepper. *Price*, 10 cents.  
 PRIMITIVE ART. *Price*, 15 cents.  
 THE BIRDS OF THE VICINITY OF NEW YORK CITY. By Frank M. Chapman, Sc.D. *Price*, 15 cents.  
 PERUVIAN MUMMIES. By Charles W. Mead. *Price*, 10 cents.  
 THE METEORITES IN THE FOYER OF THE AMERICAN MUSEUM OF NATURAL HISTORY. By Edmund Otis Hovey, Ph.D. *Price*, 10 cents.  
 THE HABITAT GROUPS OF NORTH AMERICAN BIRDS. By Frank M. Chapman, Sc.D. *Price*, 15 cents.

- THE INDIANS OF MANHATTAN ISLAND AND VICINITY. By Alanson Skinner. *In preparation*.  
 THE STOKES PAINTINGS REPRESENTING GREENLAND ESKIMO. *Price*, 5 cents.  
 BRIEF HISTORY OF ANTARCTIC EXPLORATION. *Price*, 10 cents.  
 TREES AND FORESTRY. By Mary Cynthia Dickerson, B.S. *A new edition in course of preparation*.  
 THE PROTECTION OF RIVER AND HARBOR WATERS FROM MUNICIPAL WASTES. By Charles-Edward Amory Winslow, M.S. *Price*, 10 cents.  
 PLANT FORMS IN WAX. By E. C. B. Fassett. *Price*, 10 cents.  
 THE EVOLUTION OF THE HORSE. By W. D. Matthew, Ph.D. *Price*, 20 cents.

### REPRINTS

- THE GROUND SLOTH GROUP. By W. D. Matthew, Ph.D. *Price*, 5 cents.  
 METHODS AND RESULTS IN HERPETOLOGY. By Mary Cynthia Dickerson, B.S. *Price*, 5 cents.  
 THE WHARF PILE GROUP. By Roy W. Miner, A.B. *Price*, 5 cents.  
 THE SEA WORM GROUP. By Roy W. Miner, A.B. *Price*, 10 cents.  
 THE ANCESTRY OF THE EDENTATES. By W. D. Matthew, Ph.D. *Price*, 5 cents.



The extinct great auk purchased in London by Dr. Elliot and presented to the Museum by Robert L. Stuart. A specimen of this bird would sell for six thousand dollars to-day